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ABSTRACT

Eight papers presented at an international symposium on teacher education research are featured in this document. Excerpts from the opening speech by Erkki A. Niskanen, Dean of the Faculty of Education at the University of Helsinki, outline research projects being carried out by teacher educators at the university. A paper by Yrjo Engestrom, Pentti Hakkarainen, and Simo Seppo (Finland) deals with "The Relevance of Materialist Didactic Theory in the Analysis and Development of Instructional Practice." A bibliography of over 100 references, and sample ancient history instructional materials are appended. In "Research on Teaching Activity in Hungary" and "The Methods of Teacher Training in Hungary," Ivan Falus discusses beginning teacher research and the integration of new Western teacher training techniques in Hungary. Two papers, written in German, are: (1) "The Relationship between Theoretical and Practical Training in Teacher Education: Status Discussion," by Albrecht Herrmann (East Germany), cites the importance of learning and knowledge to the preparation of teachers and suggests a model day for teacher education students; and (2) "The Training of Degreed Natural Science Teachers for the Polytechnic "Oberschule" of the German Democratic Republic at Universities and High Schools with an Example of Chemistry Teacher Preparation," by Hans Keune, describes the 10-year program in East Germany to train chemistry teachers. Elements of a successful model for student teaching are outlined in "The Background for Describing the Model," by Hans Jorgen Kristensen (Denmark). Arye Perlberg and Ehud Bar-On (Israel) present "An Evaluation of the Relative Effectiveness of Different Training Systems in Teacher Training," an investigation of microteaching techniques. (FG)

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edited by Erkki Komulainen

RESEARCH ON TEACHING AND THE THEORY AND PRACTICE IN TEACHER TRAINING

UNTERRICHTSFORSCHUNG UND DIE THEORIE UND PRAXIS IN DER LEHRERAUSBILDUNG

Papers presented at an international symposium
in Helsinki, October 2nd and 3rd, 1980

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PREFACE

This is a collection of papers presented at an international symposium held in Helsinki, October 1980. The Faculty of Education had a pleasure to receive many foreign scientists from East and West. The support by the Nordic Society for Educational Research (NSER) made it possible to have participants from the other Nordic countries, too.

Even to organize a small symposium takes time and energy. The members of the research seminar DPA Helsinki (didactic process analysis) gave valuable help in many ways. I would like to thank my colleague and friend, Professor Pertti Kansanen who shares responsibilities with me. For the financial help I wish to thank Mr. Jaakko Numminen, the Secretary General of the Ministry of Education, and Mr. Matti Malmberg, a head in the administration of the Helsinki University. I am indebted to the Dean of the Faculty of Education Erkki A. Niskanen for his positive attitude towards the symposium, and to Professor Pertti Kansanen for the permission of publishing this material.

Skillful assistance and secretarial help by Miss Afiye Bavautdin made it possible to get this work completed. Each author is, however, responsible for the content and the language of the article.

Communications can be addressed directly to the author of each paper (see Appendix II).

Erkki Komulainen
Editor

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Research on Teaching and the Theory and Practice in Teacher Training. Unterrichtsforschung und die Theorie und Praxis in der Lehrerausbildung. Papers presented at an International symposium in Helsinki, October 2nd and 3rd, 1980. Research Report 4. Department of Teacher Education, University of Helsinki, 1982.

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About the Research Activities at the Faculty of Education

by

Professor Erkki A. Niskanen,
Dean of the Faculty of Education,
University of Helsinki

Parts of the Opening Speech

Education in Finland has been presented with a great amount of resources lately. When teacher education became the responsibility of the universities in Finland, also new resources were created. At the moment we have about 70 professors and assistant professors of education in Finland. In addition the number of assistants and lecturers is high. In the Faculty of Education of Helsinki University we have four professors, eleven assistant professors, more than two hundred lecturers, ten assistants and departmental secretaries, and a great number of secretarial and administrative personnel. All this makes it possible to carry on manysided research in the Faculty.

At the moment the most important research projects are: EDUCATIONAL AIMS PROJECT, started in 1973, connected closely with the overall school reform in Finland. When chairing several committees of the state, I realized the importance of starting a project on educational aims within the University. The project centers on the general objectives in education, as well as on specific objectives within various subjects. Many publications and dissertations have been completed within this project.

Higher education in Finland has undergone a degree and syllabus reform. Today all universities and colleges in Finland have the new degree system. To give the degree reform a scientific foundation, a DEGREE AND SYLLABUS REFORM PROJECT was set up. In this project of mine we are paying special attention to the problems that come up with the realization of the reform.

Since the implementation of the comprehensive school in Finland, much attention has been paid to its functioning. One of the areas of interest is the development of teaching materials. For that purpose I have started a large TEACHING MATERIALS PROJECT at the Department of Education. Its aim is to deal with the problems that come up in developing, producing and using teaching materials.

I have also set up a project for the overall EVALUATION OF THE SCHOOL REFORM. A great number of educational institutes, as well as research and administrative personnel participate in this project. The purpose of this investigation is to develop methods of evaluation and produce results based on evaluation, especially for innovation.

Professor Anna-Liisa Sysiharju is the leader of FROM CHILDHOOD TO PARENTHOOD: THE FAMILY-LIFE EDUCATIONAL PROJECT. This project is closely associated with family education. The study is supported by the Academy of Finland. Its purpose is to find out how a child grows up to become a member of the family in a Finnish home and prepares for the role of a spouse and a parent. The study is used for family educational purposes.

Under the leadership of Professor Juhani Jussila is carried on a project called CONSUMER EDUCATION IN TEACHER TRAINING. This project is a part of a joint study, financed by the

Nordic Council of Ministers and its purpose is to plan and try out various kinds of patterns to find a way to link consumer education with the training of a comprehensive school class-teacher, as well as to evaluate the practicality of these patterns.

Professor Johannes Alikoski is the leader of a large TEACHER TRAINING PROJECT. It is closely connected with the studies on teacher education that were started by Professor Matti Koskenniemi as early as in the 1950's. During the last few years the study has centered on the selection of the teacher-trainee candidates.

ABC-PROJECT is led by Assistant Professor Juhani Hytönen. Its purpose is to clarify, to what extent the aims of elementary teaching are obtained where individual pupils are concerned. This study is multi-disciplinary.

Also led by Assistant Professor Juhani Hytönen is the ACTIVITIES MATERIAL FOR THE PRE-SCHOOL EDUCATION PROJECT. It studies the usefulness of the materials meant for developing the child's whole personality.

Assistant Professor Pertti Kansanen is the leader of the REALIZATION OF CURRICULUM PROJECT. Its aim is to study how the written curriculum becomes a lived curriculum.

Another of Assistant Professor Kansanen's projects is the HEALTH EDUCATION PROJECT. It was set up for developing the research connected with health education.

The most recent field of research has been started by Assistant Professor Anna-Liisa Leino. In this project LEARNING PROCESS IN TERMS OF LEARNING STYLES AND STRATEGIES is studied. The most central element in the teaching-learning process is the individual learner. Teaching should

be adjusted in terms of the learner, but so far there is not enough information available on those learner characteristics that could be used as a basis for teacher adaptation. Therefore this field of study is very important.

Professor Emeritus Matti Koskenniemi has started the very large and intensive PROCESS ANALYSIS PROJECT. Today the leader of the project is Assistant Professor Erkki Komulainen. It was started in 1967. This project is by character basic research that during the first few years centered on methodical and taxonomic problems. A very large amount of material has been collected in this project. The paradigm of the investigation comprises joint planning, realization and evaluation of instruction. The approach to the study can be characterized as an intensive case study. It is this project that has given the idea for the present symposium.

The Relevance of Materialist Didactic Theory in the Analysis and Development of Instructional Practice.

by

Yrjö Engeström & Pentti Hakkarainen & Simo Seppo

I THE NECESSITY OF A NEW APPROACH IN THE STUDY OF INSTRUCTION

1. The enduring dilemmas of instructional practice

On the level of the directly observable phenomena, the teaching practice of western schools is characterized by three enduring dilemmas. These are (1) the 'recitation model' of instruction and pupil passivity, (2) the learning difficulties, failure and 'pretended learning' of a great portion of the pupils, (3) the low cognitive level of instruction. In the following, we shall briefly describe each of these.

The 'recitation model' of instruction

Nuthall and Snook summarize the 'rules of the classroom game' originally described by Bellack and Davitz (1963):

"The teacher obeys a set of rules which stipulate that he must do most of the talking and must structure the specific form and content of the verbal game at any one time. If he plays in the way expected of a teacher he will spend most of his time asking questions and commenting on pupil responses. From time to time he will spend time structuring the content and providing summaries of previous discourse.

The rules for the pupils are much more restrictive. The pupil's primary task is to answer questions, to reply when called on. The pupil must respond as though the teacher always asks questions which the pupil should be able to answer. ... The pupil is expected to pay attention to the progress of a lesson even though he will not be expected to respond more than six or seven times in an hour. When he is asked to respond his response will be repeated, praised or commented on by the teacher. Most of his time will be taken up listening to other pupils' responses and the teacher's comments to those responses." (Nuthall & Snook, 1973, 52)

Hoetker and Ahlbrand, in their nearly classical historical analysis, showed the resistance of this phenomenon to all kinds of inventions: "The studies that have been reviewed show a remarkable stability of classroom verbal behavior patterns over the last half century, despite the fact that each successive generation of educational thinkers, no matter how else they differed, has condemned the rapid-fire,

question-answer patterns of instruction." (Hoetker & Ahlbrand, 1969, 163)

In Scandinavia, studies reported by Callewaert & Nilsson (1974; 1980) and especially Lundgren (1977; 1979) confirm the persistence of the same recitation pattern of instruction. Lundgren notes: "This reduction of the instructional language presents teaching as an utterly dull and nearly mechanical process." (Lundgren, 1979, 177 - our translation)

Failure and 'pretended learning'

Block sharply points out the following:
"Present policies and practices continue to reproduce the same normal achievement distribution in the learning of classroom after classroom of students that was produced in the learning of the students' parents and perhaps grandparents. Thus the schools continue to provide successful and rewarding learning experiences for only about one-third of our learners." (Block, 1971, 2)

The subtle mechanisms behind this circle of failure have been aptly analyzed by Henry (1963), Holt (1964) and Jackson (1968). Lundgren has also vividly described the instructional process that leads so many pupils to 'pretended learning':

"What has happened is the following. Ted lack. the necessary previous knowledge needed to solve a problem. The teacher has neither the chance nor the time to analyze the deficiences in Ted's previous knowledge. Since time is limited and the teacher is supposed to go through a number of problems prescribed in the teaching materials, he tries to show Ted how one is supposed to do. This is the only possibility the teacher has in this situation. The teacher goes through the problem by breaking it down into the individual steps of its solution. The spoken interaction is built around a series of utterances in which Ted's task is to complete an utterance which the teacher begins. ... In order to accomplish these completions one needs a certain competence. We have ... pointed out two types of competence, namely the one which concerns substantial knowledge in the area the interaction is dealing with (type A) and the one which concerns the situational connection (type B). These two types on competence naturall; develop side by side and support each other. We chose this example ... to show how they can conflict each other. What happens is that the teacher breaks down the interaction so that Ted's competence becomes sufficient, but at the same time the type A competence is not developed which is the purpose. To the contrary, what develops is type B competence. ... What Ted has learned is thus firstly something about his

own capacity to learn (metalearning) and secondly something about the use of language in a certain situation. The entire sequence of interaction can be called guiding (´lotsning´). Ted is guided through a task by the teacher but his own competence to clear the task improves minimally." (Lundgren, 1979, 216-217 - our translation)

The low cognitive level of instruction

This dilemma is formulated by Taba as follows:
"Curriculum is seldom organized to focus on active formation and use of abstract ideas. Classroom learning experiences are not usually designed to provide a cumulative sequence for the learning of cognitive skills which is at once psychologically sound and logically valid.

All this has contributed considerably to underachievement in the mastery of autonomous and disciplined thought processes. Current teaching-learning procedures tend to cultivate a passive mastery of ideas instead of their active discovery, a tendency to follow 'recipes' in solving problems instead of analyzing problems and searching for generalizations with which to organize facts and plan an attack on problems." (Taba, 1964, 2)

In Bellack´s analysis of the verbal interaction in classrooms, the same dilemma has been noted:
"By far the largest proportion of the discourse involved empirical (i.e., factual) meanings." (Bellack & al.,1966, 86)

And Callewaert and Nilsson confirm this on the basis of their observations in Swedish schools:
"We could see no examples of the pupils being led to discriminate between the main idea and secondary details. Neither could we see any examples of practice in the ability to actively and critically evaluate and form an opinion." (Callewaert & Nilsson, 1974, 75 - our translation)

2. Why do the dilemmas persist?

This question is posed by Hoetker & Ahlbrand:
"What is there about the recitation ... that makes it so

singularly successful in the evolutionary struggle with other, more highly recommended methods? That is, what survival needs of teachers are met uniquely by the recitation?" And further: "Or, is it not possible that the practicing teachers are right, and the professors unrealistic, and that the recitation - for some reason - is the best pedagogical method? Or the only practicable one for most teachers?" (Hoetker & Ahlbrand, 1969, 163)

This question has immediate bearing on the other two dilemmas. What forces the teacher to cling to recitation, to ignore the deficiencies in the pupils' previous learning and to continue teaching on a low cognitive level?

In our opinion there is a relatively simple answer to this. The teacher faces a difficult double task of (a) managing and controlling a group of some 30 pupils in every lesson and (b) of covering a rather large amount of subject matter prescribed in textbooks and curricula. To accomplish this, teachers have slowly but surely developed an artisan-like craftsmanship of their own - namely, the technique of recitation which necessarily includes those two other dilemmas described above. This type of craftsmanship is persistent because it is safe: in most cases it protects the teacher from major disasters. Above all, the rapid-fire questioning is an efficient tool for 'keeping the class on its toes', for the elimination of disturbances. Why should a teacher give up this model - especially when there are no really viable, secure alternatives?

In other words, we are dealing with a spontaneously and empiristically developed craftsmanship, with an essentially pre-scientific and pre-technological type of occupational practice. There should be nothing very strange in the persistence of this kind of phenomenon if we study the history of other artisan occupations.

The studies of Smith and Geoffrey (1969) and Kounin (1970) illustrate our point. Smith and Geoffrey point out the importance of "situational thinking" in the teacher's

daily work. They further list the following attributes of "the teaching art": 'awareness, provisional try, ringmastership, continuity, sequential smoothness, pacing, teaching in motion, shaping" (Smith & Geoffrey, 1968, 97). The authors further note: "The textbook controlled the content and sequence dimensions of the body of the daily lesson." (Smith & Geoffrey, 1968, 177) This they see as related to the "teacher's preparation, time and energy": "In a situation that is so demanding and fatiguing, any savings is a tremendously reinforcing contingency." (Smith & Geoffrey, 1968, 184)

These observations are closely related with the dimensions of teaching style suggested by Kounin (1970): 'withitness', 'smoothness', 'momentum', 'group alerting' etc. The common factor seems to be the general finding that a teacher is above all a more or less sensitive and skillful artisan of situational group management and control. The rather picturesque names Smith and Geoffrey and Kounin have given to the attributes or dimensions of the art of teaching remind us of the language connected with 'the mysteries of the craft' in traditional artisan trades. As Dreeben says, "for the most part, the work of teachers has remained unconceptualized as have those aspects of the environment that may in fact be related to the character of the work" (Dreeben, 1973, 454).

3. The direction of development: the real subjection of teaching to capital

Karl Marx wrote:

"The production of absolute surplus value turns exclusively upon the length of the working day; the production of relative surplus value revolutionizes out and out the technical processes of labor, and the composition of society. It therefore presupposes a specific mode, the capitalist mode of production, a mode which, along with its methods, means and conditions, arises and develops itself spontaneously on the foundation afforded by the formal subjection of labor to capital. In the course of this development, the formal subjection of labor to capital is replaced by its real subjection." (Marx, 1967, 510)

The decades after the second world war have witnessed immense scientific and technological progress. This has meant

an unprecedented growth in the volume and importance of skilled and intellectual work and, subsequentely, of education. This development has also brought about an increasing push toward the real subjection of different types of intellectual work to capital in the sense defined by Marx in the passage cited above. Educational and instructional work is one of the central areas of this development - due to its quantitative importance and its special role in the reproduction of other categories of skilled labor.

According to Sarfatti-Larson (1980), the real subjection of intellectual labor to capital is characterized by the following three general tendencies:

(1) "the tendency to increase and rigidify the division of labor, with two principal effects: augmenting the delegation of routinized or menial tasks to lower level workers, and multiplying lateral specializations, which may be of lower or similar level";

(2) "intensification of labor: obviously parallel to the speed-ups in manufacturing industry, it reduces the periods of inactivity or preparation between tasks";

(3) "routinization of high level tasks", which "implies expert intervention, with either the deliberate purpose or the unintended effect of codifying oft-repeated operations", with the result that "managers can then use the results of codification to break down operations and reassign partial tasks to cheaper and less educated workers, or ultimately to cybernetic machines". (Sarfatti-Larson, 1980, 163-164)

These tendencies are closely associated with the concentration of intellectual labor in big, bureaucratic and centralized organizations. ... "as specialized educated workers become integrated in large scale organizations, their work becomes dependent on the latter's infrastructure and on the complex division of labor which it supports. ... the centralization of authority, the complexity of coordination and the tendency to reify administration into a 'separate science' reduce the scope of work and narrow the sphere of autonomy." (Sarfatti-Larson, 1980, 162) And further: "Under financial pressure, the focus of managerial policy is clear, however undecided or unpredictable its strategies: costs must be reduced and/or productivity must be increased. ... The next

step is to aim efficiency measures and cost-effective controls at the work activities of the higher level employees." (Sarfatti-Larson, 1980, 163)

All this requires the application of 'scientific management' in the fields of intellectual work - in our case, in the field of teaching. The real subjection of work to capital is possible only through the massive use - and misuse - of science. In the field of instruction, the instructional technology movement is nearly synonymous with 'scientific management' and rationalization of the work of teaching. Travers has analyzed the instructional technology movement of the 1960's and 1970's in the USA:

"The new machinery for educational change modeled itself after other contemporary industrial enterprises and sought to change the school, and hence society, by delivering packaged products. The concentration on the packaged product seems to stem largely from the fact that there exists machinery for distributing such materials. The idea of packaged reform in education fits well with the way in which other sections of our society operate." (Travers, 1973, 984-985; see also Lundgren, 1979)

He points out the impact of Skinner's operant psychology on the development of the idea of detailed, mechanical control of pupil responses in the instructional process:

"The materials are developed to produce, in those exposed to them, the step-by-step development of skills, much as a car is assembled step by step on the production line. ... Both systems are designed to produce a uniform product that will fit into a smoothly running system. ... Improvement of education as it appears in much of the contemporary literature produced by the new technologists means improvement along any of the dimensions of utility and reliability effect, time, and cost'." (Travers, 1973, 987)

Tesconi and Morris add an important observation to this:

"The factory-like conception of schooling takes on more importance as large corporations move into the educational 'industry' on a profit or nonprofit basis to package and sell books, programs, TV offerings, language laboratories, consultation services, and training programs. Most important in terms of long range implications, they are increasingly involving themselves in basic educational research and evaluation. Thus bureaucratization efforts are likely to be spurred on by the increasing influence of business in the schools, and technology - both hardware and rationalized procedures for achieving predetermined ends - will become more and more visible in educational institutions, the prevailing rationale for the management of American schools." (Tesconi & Morris, 1972, 156-157)

No doubt, the original educational technology movement has been only the beginning of the progress of real subjection of instructional work to capital. The recent discussion on 'educational accountability' as well as new intensified evaluation models and projects of 'organization development' (OD) in schools should be interesting objects of study in this light.

Instructional technology offers a "solution" to the persisting dilemmas of traditional teaching. It promises to "individualize" instruction, to control each step in the learning of every individual and to eliminate all unwanted behavior through the use of immediate sanctions and reinforcements. All this will be achieved by using 'teacher-proof' standardized materials and procedures.

In spite of these great promises, instructional technology has not been very successful in winning over the teachers. The rather stiff and troublesome process of implementing behavioral objectives, one of the major facets of instructional technology, in everyday teaching practice is a case in point. Practically every 'respectable' textbook in the field demands the teachers to use and design behavioral objectives of instruction. However, "despite the stress on objectives in training for planning, ... in practice most teachers resist stating behavioral objectives" (Morine, 1976, 9).

This cannot be explained solely on the grounds of a general traditionality and resistance to innovation. Instructional technology does offer security and protection against uncertainties. It is viable and visible. It works - and this has been demonstrated to the teachers again and again by eager merchants of both software and hardware.

Thus, the explanation to teacher resistance must be found elsewhere: in the spontaneous disapproval of becoming mechanized, of loosing the small and hidden elements of creativity inherent even in the recitation model of teaching. The traditional model of teaching, based on only formal subjection of instructional labor to capital, contains the possibility of some - even if just occasional or exceptional - moments of real, use value oriented learning where the pupil actually understands the substance of instruction and gets interested in this substance because of its sheer meaningfulness and explanatory power. Instructional technology promises to eliminate this shadowy element and to replace it with an assembly line where the source of motivation lies in the tokens and external rewards, in the exchange value of the units and courses completed by the pupil.

4. The other side of the coin: the "humanization" of instruction

Just as the human relations doctrine has functioned as an alternative and counterbalance of Taylorism in industrial management, so the strivings for a "humanization" of teaching function today as an alternative and counterbalance of instructional technology. Tesconi and Morris offer a neat example of this. Their book, titled 'The Anti-Man Culture: Bureautechnocracy and the Schools', contains an enthusiastic and partly convincing attack on instructional technology and on the bureaucratization of education. At the same time, the book is built on the conviction that science itself is the enemy of all healthy personal and human development. "Scientific explanation cannot show concern for the individual or the singular." (Tesconi & Morris, 1972, 118) Therefore, "science, simply because it is science, cannot know the

unique person. There is no such thing as a `science of the person´. It is a contradiction in terms." (Tesconi & Morris, 1972, 182)

Tesconi and Morris are right when they point out that "the extension of scientific methodology into the study of human nature and behavior is completely consistent with the requirements of bureautechnocracy" (p. 121). But they fail to see that there are qualitatively decisive differences within science itself and that by the use of science in the subjection of labor to capital the capital has produced a force of immense inner contradictions and great unpredictability. There is no way back to the era of non-science and there is no way to hide from science in modern capitalism. The only way forward is to grasp the contradictions within science, to articulate and deepen them consciously, to use the emancipatory power of science against the enslavement of man through science.

The failure to understrand the double nature of science brings Tesconi and Morris to the doctrine of anti-scientific, anti-rational "humanization" of instruction, to the fruitless effort to set the emotional and personal against the rational and the general.

"We arrive at a new focus for educational effort: personal significance. And we put the criterion forward without delay. If an experience expands awareness and intensifies personal significance, it is educational. ... We offer three representative qualities such an experience might be expected to provide: (1) a heightened feeling for other people´s phenomenology; (2) an intensification of one´s own sense of personal responsibility; (3) an expansion of affective curiosity." (Tesconi & Morris, 1972, 208)

Carl Rogers, the foremost exponent of the "humanization" of instruction, carries the argumentation to a logical conclusion: "Teaching means `to instruct´. Personally I am not much interested in instructing another in what he should know or

think. .. Teaching is, for me, a relatively unimportant and vastly overvalued activity." (Rogers, 1969, 103) And further: "I have come to feel that the outcomes of teaching are either unimportant or hurtful." (p. 153)

The much more moderate attempts at "humanization", represented by research on 'classroom climate' (Flanders, 1970), have concentrated on demanding more 'warmth' and less 'directiveness' from the teachers (see the review in Dunkin & Biddle, 1974, chapter V).

Callewaert and Nilsson have analyzed the societal functions of the tendencies toward "humanization" of instruction. They point out the following three functions:

(1) "In the present society, mechanisms and ideology are much more than earlier built on the individual as a citizen, employee and subject of all kinds of individual consuption preferences and 'voluntary deals'."

(2) "The organization of education becomes partly alienating for both the pupil and the teacher through the pre-programmed self-instructing devices and materials. Both teachers and pupils may become more and more resistant toward instructional technology if they are not given more room for an active subject-subject relationship between the instructor and the instructed."

(3) "The self-selection of the pupils (on the basis of self-chosen activities) will gain more and more ground since the school is not able to cut down the hardening pressures on student achievement. The school hasn't got power to resist the societal demands for selection and it is forced to move over to a system which for teachers and pupils appears as the pupils' self-selection." (Callewaert & Nilsson, 1974, 77)

Thus, the "humanization" effort in instruction turns out to be - consciously or unconsciously - a complementary and balancing phenomenon, "lubricating the harshness of a technological machinery" (Kvale, 1976, 109).

5. The common basis of recitation, instructional technology and "humanization"

Today's teacher in a capitalist society finds herself bewildered between three "alternatives": the traditional

recitation, the new "scientific" instructional technology, and the cry for a "humanization" of instruction through emotional engagement and unique experiences. No wonder that many a teacher regards the pedagogical atmosphere as chaotic.

Beneath a chaotic surface there is, however, something very logical. In fact, all these three "alternatives" have certain basic principles in common. These are:

(1) Empiricism and sensualism. The traditional recitation model is aimed at teaching simple, descriptive facts and techniques; concepts are taught solely on the basis of comparison and classification of the external, visible features of things and phenomena. Instructional technology, by breaking down the subject matter into steps and by concentrating on the external "terminal behaviors" carries this further, toward elimination of such invisible constructs as generalization, transfer, principles, structures and theoretical thinking.[1] And "humanization" preaches the immediate sensual experience as the only source of personal growth.

V. V. Davydov analyzes this principle of empiricism and sensualism as follows:

"The social task of the school dictated not only the school to select utilitarian empirical knowledge and habits exclusively, but to specify and plan also a general psychic horizon, a general way of thinking for those who attended its lessons. This school preserved, cultivated and, in more or less numerous logical forms, established rules of an empirical-analytical thinking, proper to an individual's everyday practice. Such a way of thinking carries a qualifying, cataloguing character and ensures man's orientation in a system of already accumulated knowledge of external specialities and characteristics of the individual phenomena of nature and society. This kind of orientation is necessary in

solving of stereotype work activities at home, but, at the same time, it is insufficient for mastering of the nature of contemporary science as well as for forming of creative, active attitudes to reality (such a relation requires an understanding of the inner contradictions of things, which are ignored by an empirical judgement).

A one-sided training of children in an empirical way of thinking ultimately caused those springs of practical and intellectual life to dry up which feed the creative, active life on an individual and form the ground for a versatile development of his abilities. Up to a time, such 'drying up' corresponded to general strategical tasks of the school, preparing only a 'partial man' for the capitalist production, as a screw serving a machine and acting as its subordinate part." (Davydov, 1980, 42-43)

(2) Reductionism. All three models claim they have found the basic element of instruction. For traditional recitation it is the "fact" as a static piece of knowledge to be memorized. For instructional techology, it is the stimulus-response connection, i.e. the "terminal behavior". And for "humanization", it is the unique experience or simply the socio-emotional situation as such, exemplified by Rogers' "moments of intense awareness" as well as by Flanders' more moderate search for the smallest tangible "event" of social interaction in the classroom.

Vygotsky's classic treatment of the method of reducing psychological phenomena into their elements is an adequate evaluation of all the three "alternatives":

"Two essentially different modes of analysis are possible in the study of psychological structures. It seems to us that one of them is responsible for all the failures that have beset former investigators. ...

The first method analyzes complex psychological wholes into elemets . It may be compared to the chemical analysis of water into hydrogen and oxygen, neither of which possesses properties not present in the whole. The student applying this method in looking for the explanation of some property of water - why it extinguishes fire, for example - will find to his surprise that hydrogen burns and oxygen sustains fire. These discoveries will not help him much in solving the problem. Psychology winds up in the same kind of dead end when it analyzes verbal thought into its components, thought and word, and studies them in isolation from each other. In the course of analysis, the original properties of verbal thought have disappeared. Nothing is left to the investigator but to search out the

mechanical interaction of the two elements in the hope of reconstructing, in a purely speculative way, the vanished properties of the whole. ...

In our opinion the right course to follow is to use the other type of analysis, which may be called analysis into units. By unit we mean a product of analysis which, unlike elements, retains all the basic properties of the whole and which cannot be further divided without losing them. Not the chemical composition of water but its molecules and their behavior are the key to the understanding of the properties of water. The true unit of biological analysis is the living cell, possessing the basic properties of the living organism." (Vygotsky, 1962, 3-5)

(3) Formalism. All the tree models have an alienated attitude toward the contents, the subject matter of teaching. For the traditional recitation, the subject matter is the necessary formal legitimation of teaching as an activity - but the contents of the subject matter are really of little interest; the main interest is in the management of the class and in the 'covering' of the required daily and weekly pages in the textbooks. For instructional technology, definitely the main objective is to increase the effectiveness and efficiency of instruction, measured in terms of quantitative outputs, abstractly exchangable in the market of credentials and certificates. For "humanization", the contents are - if possible - even less important. The process itself is what counts: the quality of emotional involvement, the quality and the quantity of interpersonal exchange.

This indifference - and ignorance - toward the contents of instruction leads to methodical fetishism in thinking about teaching. The methods, the forms, the procedures of teaching are given an independent life and all-embracing importance. At the same time, the methods are pictured as content-neutral. Klafki has recently warned about this fallacy:

"Every method contains already - reflected or unreflected - precedents and decisions concerning the objectives and the contents." (Klafki, 1976, 79)

> And further: "The sense of the instructional method is ... to make the methodical structure of the involved instructional themes accessible to the pupils, to open the immanent methodical side of the themes. ... The method must be adequate to the methodical structure of the contents concerned." (Klafki, 1976, 88 - our translation)
>
> Above all, we should bear in mind the conclusion formulated by Travers:
>
> "The conservative in education seeks to develop the traditional skills at less cost to the taxpayer. The radical seeks to change the content of the educational program to improve the quality of life by seeking new patterns of living." (Travers, 1973, 988 - our emphasis)[1]

Any new instructional approach that claims to have a scientifically and practically sound solution to the enduring dilemmas of today's instructional practice must be able to overcome the three paralyzing fundamental principles characterized above. It is improbable that this can be achieved without becoming conscious of the socio-economic factors which provide the breeding ground of instructional approaches. In other words, the emerging new instructional pradigm must be able to step over the classroom walls and analyze the socio-economic determination of instruction; it has to integrate the cognitive and the societal dimensions of teaching and learning.

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1) In this question, the teachers' spontaneous resistance to instructional tehcnology may serve as a starting point to development:
"... the kind of decision used by the greatest number of teachers (both elementary and secondary) concerned pupil activities: 81 % of teachers' plans included this. The decision which teachers most frequently made pertained not to objectives but to the content to be covered: 51 % of teachers put content decisions first; objectives were substantially second to this, at 28 %." (Morine, 1976, 14; see Zahorik, 1975)

II THE THEORY OF INSTRUCTION BASED ON THEORETICAL GENERALIZATIONS

1. The necessity of improvement of the quality of instruction in the Soviet school

A.M. Arsenjev (1970) characterized defects of school learning in Soviet Union as follows:

"Learning at school has too much of an illustrative and fact-weighted character. It demands recollection of encyclopedic facts. Because of the rapid change and increase in scientific information knowledge of this type loses its significance. Summative acquisition and remembering of information is the reason for the fact that the role of learning in intellectual development of the pupil has not been utilized enough. Especially skills of critical analyzing and independent use of knowledge are not developed" (p. 20).

Arsenjev (1970) sums up the results of the committee which analyzed contents of teaching as follows:

"In grades I-IV the curriculum is filled with monotonous exercises. They do not take into account the increase in the learning potentials of children during the last 20 - 30 years. Elementary teaching has been extended too far and the curricula of grades V-VIII are filled with encyclopedic facts. Acquintance with scientific knowledge has been postponed until the last grades of the school. Thus they do not have sufficiently extensive effects on the learning process and pupil's development at school" (P. 20 - 21).

Excessive factual contents of teaching and weak developmental effect of teaching gave rise to reform activity and research efforts in the field. Leading scientists were members in special subject matter committees. This work aimed at raising the scientific-theoretical level of teaching by choosing basic concepts and knowledge from every science. Isolated facts should be replaced by the basic concepts of each science in teaching. Committees defined in every school subject a leading theoretical principle which systematisizes the knowledge transmitted by the subject. The core of this reform was to bring teaching at school closer to scientific knowledge. (Arsenjev

1970; Hakkarainen 1979b; Markuševits 1973; Kuzina & Kolmakova 1977)

Research on methods of teaching and the psychological basis of learning had three main directions: 1) Professor Melnikov's research group tried to improve elementary teaching by increasing the amount of comparisons and connections of concepts in tasks. Tasks forced the pupils to seek differencies and similarities in facts, in processes and results, in direct and discursive operations. The amount of home work was increased noticeably. 2) Professor L.V. Zankov's[1)] research group stressed the significance of teaching methods in improving the developmental effect of school learning. Leading didactic principles in this approach are: increasing the level of difficulty in teaching, fast advancing in teaching, increasing the amount of theoretical knowledge in teaching and making pupils conscious of the learning process. 3) The research group led by D.B. Elkonin and V.V. Davydov made an effort to revise the basis of teaching and learning. The principle of theoretical generalizations has a central position in their conception. (Arsenjev 1970; Elkonin & Davydov 1966; Hakkarainen 1979a; Zankov 1966)

These research approaches emphasize different aspects in teaching and learning. Solutions of the first approach are methodical. The learning activity is planned in such a way that it utilizes more effectively the increased potentials of pupils. Increased learning potentials have their roots in general acceleration of children's development. The school should take advantage of this factor in teaching. Potentials of subject matter in influencing the psychic development of the child are not analyzed in this approach. The logic of combining subject matter and different methods of teaching is not based on the analysis of inner relations between these components of teaching.

1) Article written by M. Otte compares didactic principles of Davydov and Zankov (Demokratische Erziehung 1976, 2, 198-212)

The main emphasis in the second approach has been on the methods of activating pupils. At the same time some changes in the contents of learning are strived at. Activating methods have become an end in itself among Zankov's didactic principles.

A decisive criterion in the evaluation of different approaches will be how they solve different problems of teaching at the same time. A permanent solution should cover the problems related to the quality of knowledge, developmental effect of teaching and learning motivation. Simultaneous solving of these problems presupposes analysis of inner relations between subject matter and teaching methods. Formal combination of contents and methods does not give solid results. The research group led by Elkonin and Davydov has made an attempt to solve the problem of contents and methods at the philosophical and practical level.

2. Philosophical and gnoseological aspects of theoretical generalizations

Teaching as an activity includes the idea of forming some kinds of systems of knowledge and generalized concepts. Comparison and analysis of facts, phenomena and objects is not an end in itself. This activity aims at generalized concepts.

Especially in the lower grades generalizations are of an empirical nature. Empirical generalizations are based on the following principles: 1) every new concept is formed in the same order: perception - mental picture (image) - concept, 2) comparisons of a sufficiently large number of objects and phenomena reveal traits which are common and typical of every object and phenomenon, 3) only common and typical features are essential because concept formation is based on them, 4) individual and specific traits are unessential in learning because they are unnecessary in concept formation, 5) on the basis of common features objects and phenomena are included in a class or excluded in case of absence of common features, 6) thinking

processes proceed as parallels of concept formation and concept application (Davydov 1968, 1969, 1972).

The conception of empirical generalizations is based on the assumption that the elements of concepts are immediatly observable. Transition from percepts to concepts changes only the subjective form of basic information, not its contents. Thus there would be no qualitative differences between common and scientific concepts, only differences of degree (Davydov 1968, 1969, 1972).

Empirical generalizations may be based on any common, general and permanent traits. In principle, a football and the planet mars could be classified in the same category because of their common shape. Anyway in reality footballs have nothing to do with the life of the planet. In empirical generalizations the criteria of essential traits are situation and appearance-bound (Davydov 1969).

Empirical generalizations make the economic "storing of knowledge" possible. The abstractions formed in generalization combine isolated facts into greater units. With the help of generalizations it is more convenient to handle whole classes of phenomena simultaneously. The main deficiency of empirical generalizations is that the rigin and the process of the development of phenomena is not revealed. (Davydov 1968)

The essence of an object is usually not discernible in immediate perception. The analysis of the process of development can only reveal the whole essence of an object. The object must be translated into a phenomenon in order to discern the essence of the object. The translation of an object into a phenomenon presupposes interaction with other objects. The analysis of relations and changes in the interaction between objects can reveal the process of development (Davydov 1972).

In formal logic, the result of empirical generalization is an abstract concept and observable objects and phenomena are concrete. In dialectical logic, the main difference between

abstract and concrete is not limited to seeking a common feature for different objects and phenomena. Abstract and concrete as categories of dialectical logic reflect differences between the whole and parts (Iljenkov 1960, 1967).

According to dialectical logic abstract knowledge is isolated or generalized knowledge. Concrete knowledge consists of the type of knowledge which reflects unity of multiform. In dialectical sense abstract and concrete knowledge are not just mental processes but they reflect objective reality (Iljenkov 1960, 1967, 1979; Davydov 1972).

Scientific, theoretical thinking should reveal not only common features in a class of objects, but the unity of the general and the specific in a system of these objects. The aim of theoretical generalization is not concept formation and classification of objects and phenomena on formal, abstract basis. Theoretical generalization aims at an explanation of the genesis of a system of objects. It starts from abstractions reflecting the genetic basis, the most general determining inner relations of a system of objects and ascends to the concrete knowledge, to solving concrete tasks on the basis of the formed generalization (Iljenkov 1960; 1969; 1979; Davydov 1968; 1972).

Differences between theoretical and empirical generalizations have significant consequences in teaching because different types of thinking are linked with the types of generalizations. The weakness of formal logic on which empirical generalizations are based is that it is not possible to analyze relations between thinking processes and the contents of concepts. Formal logic is not able to discern units of contents. Thus formal logic is not a valid tool for revealing origins of concepts and it is not possible to get behind the "phenomenological surface" (Davydov 1968, 1972).

Changing the type of thinking presupposes changes in the contents of teaching and in the structure of pupil's learning activity. Pupil's learning activity should repeat in an

adequate form the genetic history of the concept. Pupil's own activity should reveal the generalized nature of the concept before the scrutiny of details. Command of scientific concepts presupposes discursive activity of the pupil (Davydov 1972).

Many scientists in pedagogics have critically analyzed empirical generalizations and thinking which is based on it. L.V. Zankov (1968, 1974) formulated the principle of raising the theoretical level of teaching. In the didactic system of Zankov, methods of activating students are primary. The raising of the theoretical level of teaching is not based on thorough philosophical analysis of relations between thinking processes and contents of teaching. This may lead to situations in which an attempt is made to raise the theoretical level of teaching through empirical generalizations and empirical knowledge.

A common feature in the developmental psychology of Jean Piaget and conception of theoretical generalizations (Elkonin and Davydov) is the critique of formal logic. In spite of this, there are many essential differences in the philosophical basis of these approaches. Arguments which Davydov (1972) uses against the approach of Piaget may be summed up as follows: 1) special traits of a mathematical approach to reality are generalized to the whole area of thinking, 2) the mathematical theory of invariances is used as general means of analyzing and describing thinking, 3) discerning invariances hardly indicates the highest levels of thinking 4) although discerning invariances is a prerequisite for theoretical thinking, it does not reveal the real essence of concepts, 5) reflection may be formal and does not automatically adhere to development as Piaget presupposes, 6) combinatory analysis does not reveal in which way discrete phenomenon origins from a common form, it does not reveal genetic relations.

3. Theoretical generalization as a didactic problem

New didactic solutions and methods are needed in the application of principles of theoretical generalization in the school practice. The main demands for learning which aims at theoretical generalization are: revealing the genesis of concepts and the discursive process of thinking. These principles have been starting points in the solutions made in didactics by Elkonin's and Davydov's research group.

In teaching practice the principles of theoretical generalization have changed the contents and structure of teaching and methods of guiding learning process. Following principles are used in the construction of themes and courses in school subjects:

"(1) children have to learn all concepts that constitute the teaching subject or its basic parts, by studying such conditions of their origin thanks to which they are getting necessary (in other words, the concepts are not presented as "completed knowledge");

(2) the acquiring of knowledge of general and abstract character precedes acquaintance with more partial and concrete knowledge, the latter have to be deduced from an abstract as from their own basis; this principle follows from the orientation to the explanation of concept origins and answers to the requirement of development from the abstract to the concrete;

(3) the pupils first of all have to discover the genetic origin, general unity, that defines the content and structure of the whole object of the concepts, in order to study objectively the material source of either concept (e.g. the general relationship of quantities is such a general unity in the object of all concepts of school mathematics, the relationship between the form and meaning of the word is a general unity in the object of concept of school grammar);

(4) this unity, has to be expressed by the special objective, graphic or sign models that allow to learn its qualities "in a clear form" (e. g. general relationship of quantities may be realized by children in a letter form, usefull for the next study of these relationship qualities; the inner construction of a word may be realized by means of a special graphic schemes);

(5) it is necessary to form expecially such objective activities in pupils, by means of which they are able to find the essential unity of the object in the studied material, and to realize it by models, and then to learn its qualities; (e.g. it is necessary to form a special activity to determine the multiplicative relation of quantitaties in children in order to reveal the relation, that consists in the basis of the concept of integers, fractions and real numbers);

(6) pupils have to proceed step by step from objective activities to their realization on an intellectual level." (Davydov 1980, 48-49)

These principles have been applied to experimental teaching in different subjects in the lower grades of the school. The whole experimental curriculum of lower grades will be built on these principles at the end of this year and experiments of country-wide application will be started. At the same time, experimental teaching programs are planned in the subjects of higher grades. The following example deals with physics teaching in the fifth grade. The theme of this experiment was "forces in the magnetic field". The goal was to construct the teaching process in such a way that pupils grasp general abstract content of interaction in the magnetic field. The following example is from Rubtsow (1975).

The teaching of the theme started from experiments in which pupils tried to form figures from iron powder with the help of magnetic rod. When the magnetic rod was moved to an optimal distance from the sheet the powder formed through intermediate phases, an ideal figure. The pupils made at first two experiments: 1) The magnetic rod was moved in a vertical position above the sheet. Above the sheet the powder formed a figure of vertical beams (the positive figure), 2) The rod was moved under the sheet. The powder formed a figure of horizontal long beams the center of which was empty (the negative figure).

The results of the first two experiments were given to pupils in the form of an experimental "map" and a "key". The map was planned for four pupils, who made experiments in the same

group. Every pupil in the group got his own key for the map. The maps had the following form:

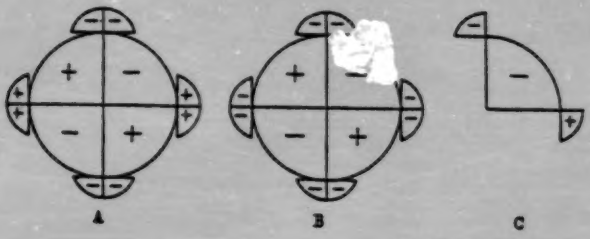


Figure 1. A is a map for getting the positive figure, B is a map for getting the negative figure, C the structure of key (Rubtsov 1975, 99)

(+ on the vertical line means: move the rod, - on the vertical line means: knock the sheet; + on the horizontal line means that the rod is above the sheet, - on the horizontal line means that the rod is under the sheet)

After getting the maps and the keys pupils had to compare their own role in the experiment with the roles of the three other pupils. The result of the experiment depends on the cooperation of all members in the group. Cooperation in the group and try outs lead pupils to the conclusion that the form of the figure depends on the position of the rod above or under the sheet.

At first the maps were planned so that the distance of the rod from the sheet was constant. This constant distance did not form the ideal figure. Pupils made a conclusion that the maps should be changed. They made the following correction:

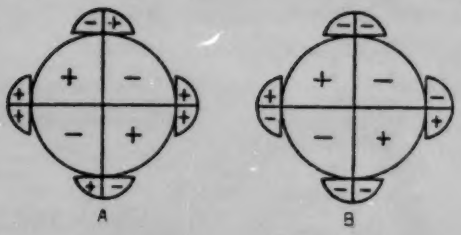


Figure 2. Corrected experimental map A- includes operation: move the rod B- to form a combined figure with two magnets (Rubtsov 1975, 101)

With the help of these stages in the experiments pupils learned cooperate on their own initiative, experimenting without the help of the teacher and find out the reasons for changes. After that it was possible to procede to the theoretical level of defining the principle of interaction in the magnetic field. It was possible to introduce the concepts of "line of force" and "empty center". These concepts were necessary in the analysis of interaction between different poles of magnets. The circular lines of force was formed when the rod was above the sheet in a horizontal position. The pupils started to examine different combined figures when the rods are in various positions. At the first stage this examination was made on theoretical level with models and afterwards in concrete experiments. These models had the following form.

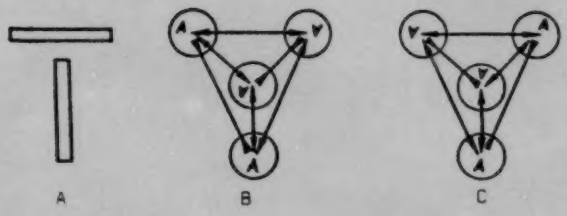


Figure 3. Theoretical models depicting interrelations of two magnetic rods: A- the position of rods, B and C - models of interaction (Rubtsov 1975, 102)

Making models of the possible results in experiments and models of changes in experimental settings changed the nature of practical experiments. The experiments were not only made for getting a result or an effect. They had an active role in learning and changing theoretical models. The changes through experiments had e.g. the following form:

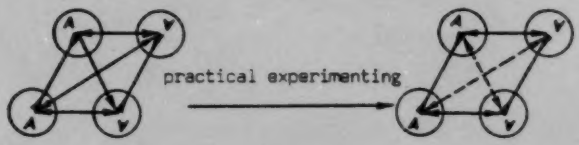


Figure 4. Changes of theoretical model through experiments (Rubtsov 1975, 103)

The same type of experimenting was organized in order to form the concept of an "empty center".

4. The conception of theoretical generalizations as an answer to the persistent dilemmas of instructional practice

Empiricism and sensualism in instructional practice are linked with psychological conceptions of school learning. In a clear form the psychological rationale for empiricism and sensualism are manifested in the didactic principles of elementary school teaching. Illustration, visualization and concretization of teaching are central didactic principles. The psychological reason for this is the fact that perception and memory are the most advanced psychic functions at this stage of the child's development.

Empiristically-oriented instructional practice takes advantage of already developed psychic functions. It is assumed that more complicated forms of thinking are directly built on the development of perception and memory. If school learning trains perception and memory, more complicated forms of thinking are attained later on. When intellectual development of the child is understood as a process of maturation, teaching is seen as the training of special psychic functions (Elkonin & Davydov 1966).

When teaching aims at the development of spesific psychic functions, the quality of concepts does not make any difference. Everyday concepts and scientific concepts have equal value in teaching. When teaching aims at more profound changes in the psychic development of the child, scientific concepts have to be used in teaching. L.S. Vygotski (1962) formulates the relationship between the psychic development and scientific concepts in the following way:

> "Scientific concepts, with their hierarchical system of interrelationships, seem to be the medium within which awareness and mastery first develop, to be transferred later to other concepts and other areas of thought. Reflective consciousness comes to the child through the portals of scientific concepts." (p 92).

The problem of empiricism and sensualism in teaching is not solved only by introducing scientific concepts into teaching. Teaching should aim at a scientific mode of thinking by using scientific concepts. The proponents of activity theory in learning (Davydov, Elkonin, Galperin, Talyzina) have analyzed the problem of how reflective consciousness is produced by using scientific concepts in teaching.

The conception of theoretical generalization attempts at solving the dilemmas of instructional practice by changing the contents, and process of learning, and methods of teaching. Units of teaching and learning are radically changed in comparison to reductionism. If the unit of teaching is a fact, an experience or a situation in reductionism, in the conception of theoretical generalization it is a substantial theme which includes a theoretical generalization - a complete "circle" of ascent from the abstract to the concrete. This presupposes changes in pupils activity. In other words the contents of teaching material should be planned in terms of the activity structures of pupils. Contents of teaching should change the structure of pupil's activity (Elkonin & Davydov 1966, Elkonin 1969, Elkonin 1974, Davydov 1972, Davydov 1976, Markova 1977).

According to the conception of theoretical generalization, the unit of learning is the substantial (theoretical) generalization. At the level of psychological development, this aims at a theoretical relation to the reality.

Substantial generalizations are formed on the basis of scientific-theoretical concepts. Scientific facts or the sum of facts do not create a basis for substantial generalizations. In the planning of practical instruction, it is necessary to find out what are these scientific-theoretical concepts in different school subjects and what is the genetic origin, general unity, which pupils should learn at the beginning of studies in each subject (Elkonin & Davydov 1966, Elkonin 1969, Elkonin 1974, Davydov 1964, Davydov 1966a, Davydov 1969, Davydov 1972, Davydov 1976).

The idea of scientific-theoretical concepts and theoretical generalization led to a new theory of school subjects. Experimental research was started in different school subjects. It was found out that the general relationship of quantities formed a general unity in the object of all concepts of school mathematics. This general unity formed an organizing principle in experimental instruction of mathematics (Davydov 1962, Davydov 1966b, 1966c, Davydov 1969b, Davydov & Tsvetkovits 1969, Bodanskij 1967, Bodanskij 1969, Fridman 1969, Ho Ngok Daj 1971, Maksimov 1979, Mikulina 1968, Mikulina 1969, Minskaja 1966). The relationship between the form and meaning of the word was found to be a general unity in the teaching of school grammar. A large-scale experimental programme was started on the basis of this idea (Aidarova 1964, Aidarova 1966, Aidarova 1969a, 1969b, Aidarova 1970, Aidarova & Saveljeva 1972, Aidarova 1974, Aidarova 1976, Aidarova & Gorskaja & Tsukerman 1977, Aidarova & Garšina 1977, Jelisejeva 1977, Jelisejeva & Garšina 1977, Markova 1966, Markova 1968, Markova 1969, Markova 1970, Markova 1971, Markova 1974, Rodionova 1970, Šagalova 1977, Tsukerman 1977).

Traditionally theoretical knowledge has had a firmer position in the teaching in the upper grades of the school. In spite of this fact the idea of theoretical generalization gives a new conception of the unity of contents and methods of teaching. Gradually the conception of theoretical generalizations has spread to the experimental teaching in upper grades. Experimental research has been carried out in natural sciences (Rubtsov 1975, Rubtsov 1977, Logvinova 1977, Jatsevitš 1977, Faraponova 1977, Faraponova & Averin 1979), history (Nilkulina 1978 a,b,c,d), arts (Ozolin 1977, Tsehanskij 1978, Vahnjanskaja 1977) and physical culture (Abysov 1978, Spektor 1978).

It is not possible to overcome empiricism, sensualism, reductionism and formalism in instructional practice only by changing the contents of teaching. The learning process and learning activity as a whole has to be changed, too. According to the conception of theoretical generalization, the learning process should be directed at consciously finding out the conditions of the origin of concepts. This aim presupposes a special structure of pupils' activity (Elkonin 1961, Elkonin & Davydov 1966, Elkonin 1974, Davydov 1976, Markova 1977)

Task[1] and action leading to mastery are structural elements of developmentally-oriented learning activity. A special feature of a learning task, according to the conception of theoretical generalization, is that the aim and result of the task are changes in the acting subject and special skills of action, not only changes in objects which the subject handles (Elkonin 1961).

Action which aims at finding out conditions of origin of concepts and a general principle of solution to a task is composed of the following elements:

1) Task has here a broader meaning than single problems in textbooks. Task aims at finding out general principles of solution for a whole class of problems

I Finding a solution

1. Setting a problem when familiar solution methods and concepts do not lead to any result
2. Seeking a solution by orienting to the general principle or relation in the problem
3. Describing the general relation and means of solution "in a clear form" or as a model
4. Examining the properties of the general principle or relation in various singular cases

II Control of the solution

The structure and qualitative features of action } ⟷ Results

III Evaluation of solution

Is it possible to find a general solution to a task with the help of a concept and means which the pupil masters at the moment?

(Davydov 1972, Markova 1977, Davydov & Markova 1978, Davydov 1980)

Orientation to scientific-theoretical concepts in building learning activity which has a special structure produces changes in pupils' thinking. Thinking attains features which are typical to scientific problem solving. Conditions of the development of scientific thinking in lower grades have been the object of study in the research effort based on the conception of theoretical generalization.

Experimental research on the formal structure of theoretical thinking is carried out in three main problems: the reflection in thinking, the development of theoretical analysis and the formation of an inner plan of action. Reflective action is an important component of a theoretical way of solving tasks.

Reflective thinking is built on conscious activity. Pupil has to concentrate his attention on the process of action. Reflective action in learning presupposes the modelling of one's own activity before acting and possibilities to apply the model in different situations. Research efforts are made to find out in which way the methods of gathering and processing information are changed when solutions are based on theoretical thinking. (Zak 1976, Zak 1977a, Zak 1977b, Zak 1978, Zak 1980a).

Theoretical generalization presupposes a special type of analysis. Theoretical analysis aims at finding out the genetic relation. This means that one has to discern different types of relations of an object: structural, functional and genetic relations. Theoretical analysis should be planned and based on reflective activity. The analysis starts from a hypothetical genetic relation and proceeds through stagewise verifications of the theoretical generalization (Nosatov 1976, Nosatov 1978).

The third component of theoretical thinking is the inner plan of action. The pupil should be able to act at the intellectual level without any material support. Ponomarjev (1964) has separated the following five stages in the development of the inner plan of action: I) Stage of reference: the child is not able to solve a problem mentally, II) Stage of reproduction: problems are solved only by manipulating objects. The child is able to reproduce mentally only the results of action. III) Stage of manipulating: The child solves problems by manipulating mental pictures. IV) Stage of transposing: Problems are solved by manipulating mental pictures, but in the case of solving the problem once again the solution forms a basic level of repeated acts. Every separate act fulfills the conditions of the task. V) Stage of programming. The method of solution resembles the solution of adults: a plan is made followed by a program of action, in the phase of implementation every act is related to the conditions of the task and the child directs consciously his acts.

The conditions of theoretical thinking have raised the problem of the structure of tasks. What should the tasks be like in order to promote theoretical thinking? It has been found out that concrete, practical tasks lead to empirical generalizations. Theoretical generalizations presuppose complex tasks which orientate the pupil to the inner relations. The problem of tasks is not solved, anyhow, by changing only the contents of tasks. Problem solving should be analyzed as activity. A special theme of teaching should be: in which way problems and tasks are solved generally (Bertsfai 1969, Bertsfai 1974, Zak 1974, Zak 1976).

5. New problems of research

First efforts in experimental research in the conception of theoretical generalizations were directed to the changes in [illegible] curricula in experimental teaching were based on developmental potential of contents of the subject matter. At the same time the structure of tasks was changed. The main criteria in the evaluation of the results of experimental teaching were the features of theoretical thinking: reflection, analysis and the inner plan of action. The analysis of learning and problem solving stimulated a new level of questions: What is the relation between the conception of theoretical generalizations and general theories of action? In which way should the conception of the dominant form of action be taken into account in teaching theoretical thinking?

The adaption of these general psychological theories into the conception of theoretical generalizations orientated experimental research to new areas and problems. Davydov (1977) characterizes general theoretical positions as follows: 1) every concrete type of action has the process of genesis, development and disappearance (e.g. the play, the learning), 2) the structural components of action exchange their functions, are transformed into each other, 3) the types of action are intertwined in the process of life, 4) every type of action originates from cooperation and interrelations between people, different objective means are used in their communication. On this basis are formed inner forms of individual action, 5) In every stage of childhood there is a special dominant action amongst other actions. This dominant action is connected with the formation of personality at this very stage.

In learning and education these general psychological principles have to be taken into account. These principles generate new research problems: 1) What are the special features of needs, motives, tasks, acts and operation in learning? 2) What are the stages in the development of learning, in which way is learning interrelated with other

types of action?, 3) What is the dynamics of the components of learning? When is the goal transformed into the motives? How are acts transformed into the operations?, 4) In which way is learning related with other forms of action?, 5) How are inner, individual forms of action generated from collective study? (Davydov 1977).

The broader theoretical orientation is reflected in experimental research. First efforts are made to characterize learning in general terms of action (Repkin V.V. 1976a, Repkin 1976b). Intensive research activity is organized to find answers for the problem of cooperation in learning (Matis 1976, Matis 19 Rubtsov 1978, Rubtsov 1980, Korostelev 1978, Korostelev 1980, Guzman 1980).

Also other general features of learning are studied: the role of the leading action type in personality development (Feldstein 1979), the origin of mental actions (Davydov & Andropov 1979), special features of teenagers' learning activity (Kravtsov 1976, Kravtsov 1977), the motivation of learning activity (Dusavitskij & Portnaja 1977, Markova 1978, Markova 1979, Markova 1980, Zolotyh 1978, Puskina 1980) and the development of the self-conception of pupils (Zaharova 1977).

As a result of intensive theoretical and practical research work the conception of theoretical generalization has gradually transformed into the conception of learning activity based on the general theory of activity developed by L.S. Vygotski and A.N. Leontjev. The following hypothesis of the contents of learning has been put forward in this new conception: special contents of learning activity are the basic forms of theoretical consciousness (theoretical relation to different aspects of reality: scientific knowledge, morality, esthetic values etc.) In these areas pupils should master theoretically generalized means of orientation (Davydov 1977).

In the first phase of research, attention was directed mainly at ways of producing new formations in the intellectual devel-

opment of pupils (theoretical thinking in lower grades). Now, in the second phase of research, more attention is paid to the problems of producing new formations in pupils' moral development (motives of learning activity).

III THE IMPORTANCE OF DAVYDOV'S THEORY FOR THE DEVELOPMENT OF INSTRUCTION IN THE FINNISH SCHOOLS

1. The curriculum of the comprehensive school under scrutiny[1]

The conception of theoretical generalizations constructed by Davydov and his coworkers brings new elements and aspects into the analysis of teaching. The conception unites in a new manner matter contents and methods of teaching. At the same time the importance of teachers' activity in guiding the process of learning is stressed. The conception of theoretical genralizations gives new tools for the analysis of teaching at the level of plans and reality.

Generalization of knowledge has been one of the aims in the report of the Finnish Committee on Comprehensive School Curriculum (1970). The following excerpt is from the report:

"Even in the everyday acquisition of knowledge man tries to draw general conclusions from his experiences and seeks for regularities and constancies in his surroundings and in the events around him. Also the systematic acquisition of knowledge concerning reality which is called science is based on observation, action and thinking. Characteristic of the acquisition of knowledge in science is to collect data systematically, to aim at as precise knowledge as possible and at knowledge that can be justified to a certain degree, and to construct broad and structured units of knowledge. There is no difference in kind between the knowledge acquired on the basis of common sense knowledge and scientific knowledge but rather a difference in degree in the direction of the

1) This part of presentation is based on the article: Hakkarainen P. (1980) Teaching process and theoretical generalization

above - mentioned characteristics. Besides scientific knowledge, also knowledge related to a specific case, to immediate observation and to experience can be valuable, because general knowledge can be applied to new cases only if the features of these specific cases are known. For this reason also knowledge acquired through practical experiences is valued in society" (p. 26 - 27).

In the committee report, generalization is considered necessary because of the economic "storing" of knowledge. It does not matter what kind of knowledge generalization is based on. According to the curriculum there is no qualitative difference between the generalization of common sense experience and generalization based on scientific knowledge. Why is it so?

One of the reason for the school reform was that the old school system emphasized the mechanical collection of knowledge too much. The school put too much stress on memorization, and the skills of thinking were not developed enough. The contents, the material side of knowledge, was overemphasized in teaching. As a counterbalance to this the formal aspect of knowledge, i.e. the development of thinking skills, was emphasized in the school reform. Although the relations between the contents and formal objectives were stressed, the planning clearly emphasized the formal skills. The rationale for this was as follows: "Although the contents of knowledge change, the formal objectives do not lose their significance" (p 28)

The significance of concept formation in the development of thinking is underlined. In the comprehensive school the basis for the acquisition of knowledge is the concrete observations made by the pupil. The report of the Committee on Comprehensive School Curriculum distinguishes observational concepts from general concepts. The observational concepts are used to classify observations. Because it is necessary to distinguish the common traits for every element in every class, general concepts are needed. Thus the generalizing knowledge is incorporated in the general concept. The report of the Committee on Comprehensive School Curriculum claims that the general concepts related to reality must be reducible to the

system of observational concepts. The teaching should aim at more and more abstract concepts, because we can control broader and broader areas of reality on the basis of them (p 28).

Objectives concerning skills of thinking have been defined so that they should take into account all teaching, in other words they should pervade all teaching. Such objectives to be considered in all teaching are e.g. the following: coordination of pereception, thinking and motor skills, conceptual mastery of the environment, the hierarchy of conceptual systems, use of analogy, rich store of exact knowledge, skills of convergent and divergent thinking, command of abstract concepts, creative thinking, skills of deductive and inductive thinking etc.

In the section on the basis of the curriculum it is emphasized that knowledge should be arranged into systematic structures. The Committee on the Comprehensive School Curriculum expresses this objective in the following way:

"The structure of any given discipline concists of its basic concepts and of knowledge which concerns their internal relations (regularities, laws). The development of any discipline means that a more "economical" description is aimed at: to be able to describe, explain and predict a maximum amount of phenomena related to a discipline by means of as few basic concepts and laws as possible.
For curriculum construction the simplification and growing abstraction of the structure of knowledge is important. It makes it possible to include matters that earlier were too complex to be dealt with in school. In curriculum construction the structure of discipline has to be translated into such language that can be understood by pupils." (p 35).

In the section concerning the systematization of knowledge the characteristics of scientific knowledge are described. The description, explanation and prediction of phenomena belonging to some branch of science is not possible without scientific knowledge. Preoccupation with key concepts and their interrelationship is an essential characteirstic of scientific knowledge.

The demand that teaching should be based on scientific knowledge is justifiable. But this demand remains an empty wish, if it cannot be systematically realized in planning the contents and objectives of different school subjects. This is a topical question in Finland because attempts have been made to define basic contents and basic skills in so-called instrumental subjects (mother tongue, mathematics, foreign languages). These projects fulfil only partly the requirements of scientific approach. Only modest progress has been achieved in defining basic concepts and their interrelationships. The starting point in the work has been the structure of the subject and needs assessments.

The demand for scientific knowledge remains an empty wish also in so far as it is not associated with the objectives of developing the pupils' thinking. The model of goal definition in the report on the Comprehensive School Curriculum does not take into account the fact that mastery of scientific knowledge only through the teaching scientific structures of knowledge is impossible. this is admitted in the definition of priority areas in the committee report, in which the development of the skills of thinking is stressed. The report assumes that the development of the skills of thinking and even of scientific thinking is possible without specific scientific knowledge.

The demand for scientific approach with regard to the contents of teaching can be extended to the skills of thinking too. It is not sufficient, then, that the pupil makes generalizations about just any knowledge. The pupils' thinking skills should be developed so that he is capable of scientific and theoretical generalizations.

2. A comparative example: 5th grade history teaching

In which way does subject matter teach basic concepts of a discipline and internal relations of these concepts. In which way are thinking skills exercised in the teaching of subject matter? What type of generalizations are aimed at in teaching? Textbooks and exercises in them direct the activity of the teacher to a great extent. As an example we have analyzed one theme in the history book in the fifth form of the Finnish comprehensive school. (Louhisola et al. 5, 1975) The theme deals with the prehistory of man.

The text of the book is structured by underling in the main ideas of every passage. The main facts in the theme are as follows: man's history is hundreds of thousands of years long, he spent his nights in caves, campfire and the skill of making fire made man superior to animals, the skill of making fire changed the whole life of man, traces from that time are called archeological discoveries. Underlining draws pupils attention to discrete words in the text. Imprtant words are: hundreds of thousands of years, caves or caverns, fire, camp fire, changed, archeological discovery.

A distinguished feature of the text is that facts are described in a static way. The process of historical development is described unhistorically. The text illustrates discrete facts, not processes. Subject matter does not explain the origin of man. Suddenly there appeared a prehistorical man seeking for food. He lived like animals. A decisive change happened in the life of man when he discovered fire. Archeological discoveries have revealed weapons, tools and pottery. The subject matter does not give any explanation for these discoveries. Where do these objects come from? Who made them and why? If fire changed the life of man, what kind of changes did weapons, tools and pottery bring?

History teaching brings man to the times of litteracy without any explanations of factors influencing the historical process. The textbook distinguishes no turning points in the long prehistory of man. Pupils get the impression that it is a very long time, but there has not been any other qualitative changes except the taming of the fire. The text gives no laws of development which could bring together the scattered facts and illustrations.

The structure of tasks organize the process of learning. What are the main features of tasks that organize the learning process of prehistorical facts in the textbook? What type of generalizations are aimed at in these tasks. In the textbook there are twenty-two tasks and questions for pupils. Half of these are fill-in exercises, seven multiple choice tasks, two short composition tasks, one paired association task and one coloring task. All tasks aim at memorizing the facts presented in the text. There is no problem orientation in the tasks. It is possible to answer these questions without understanding the facts presented in the text. Tasks aim at associations between different words and at memorizing discrete facts from the text presented in the textbook. Tasks do not demand any kind of generalizations.

Problem-orientation into the theme gives the tasks and questions new dimensions. Tasks are no longer exercises in memorizing the text as it is printed in the textbook. Problem situations force to analyze facts at a more general level. Pupils have to find reasons for events in the historical process. The following set of tasks deals with the same theme as the Finnish textbook:

1. What are the reasons for the fact that prehistorical groups of people often scattered?
2. Why did prehistorical people often starve?
3. Why were animals especially dangerous for people in prehistorical times?

4. What consequences did the invention of spear have for people?
5. Archeological excavations have revealed large quantities of waste stone. What does this discovery tell about the proces of making tools and about the knowledge of man?
6. What were the phases in the invention of an axe? What meaning did this proces have for man?
7. What was the most important factor that made it possible to transfer from hordes to tribal communities?
8. What is the explanation for the fact that bow and arrow appeared thousands of years after the appearance of the tribal community?
9. What is the explanation for the fact that agriculture appears in the latest stages of the development of a prehistorical community?
10. How would you explain highly developed skills of perception in prehistorical man?
11. What kind of skills and knowledge did the making of almond-shaped stone weapons demand?
12. Examine the following tools: needle, harpoon and head ferrule. Whant kind of new knowledge does man master?
13. What working methods did man have to know to prepare almond-shaped stone weapons? What are the stages of the working process?
14. How did the preparing of stone weapons (or any other tool) teach man to think (understand differences, stages, errors and their reasons)?
15. When did religion appear?
16. Examine the picture of the hunting of mammoths and find out why it was organized that way?
17. Was stealing possible and common in a tribal community?
18. What evidence is there that the appearance of agriculture increased productivity when we take into account that it is not possible to get crops soon after ploughing and sowing? (Skatkin & Krajevski 1978, 61)

These differences between ssts of tasks and the question types are not limited to the teaching of history. A comparison of textbooks in environmental studies gave the same result. According to Hakkarainen (1980):

"The exercises in the empirically oriented textbook A are mainly association tasks: the pupils are asked to combine a word and a picture with a line, to combine the youngs with their mothers, to look for words which are related to summer or to winter. Multiple choice tasks are used extensively. Childrens' observations and experiences are utlized in each theme. Childrens' experience is drawn upon even in explaining such important matters as the difference between animate and inanimate. Teaching starts with the assumption that children know intuitively the difference between animate and inanimate.

The tasks and exercised in the theoretically oriented textbook B seek to maintain the theoretical approach found in the text: essential connections between phenomena are sought. In the fourth form the pupils are presented with the following tasks: How can it be proved that light proceeds in a straight line? Why are there no forests and meadows on the moon? Planets do not emit light but we can still see them. Why? What is the season in North America when it is summer in Eurasia? How have people proved that the earth is spherical? What characteristic of light is used in the periscope?" (p 90 - 91)

Differences in subject matter, sets of tasks and structure of tasks are so clear that it would be justified to speak about different approaches in teaching. The empirical approach in Finnish comprehensive school textbooks consists of the following features: texts are descriptive and illustrative, generalizations are scanty and empirical, learning activity aims at memorizing words or facts from texts, learning is based on associations, task solving is possible on a simple mechanical level (by making a cross, drawing a line or writing a word). Theoretical approach is based on: structured texts aim at explanations of facts, learning activity aims at understanding laws and developmental processes, generalizations are based on scientific knowledge (basic concepts and their connections), learning is based on problem solving which seeks general solutions, task solving demands understanding of principles and laws of development.

References:

Abysov, M.M. (1978) K voprosu o vozmožnosti ispolzovanija printsipov utšebnoj dejatelnosti v protsesse pripodovanija fiskultury (On the possibilities of using the principles of learning activity in the process of teaching physical culture) In: Davydov, V.V. (Ed) Osnovnye problemy obštšej, vozrastnoj i pedagogitšeskoj psihologii Moscow: APN NIIOPP

Aidarova, L.I. (1964) Formirovanie lingvistitšeskogo otnošenija k slovu u mladših školnikov (Developing the linguistic relation to the word in junior schoolchildren) Voprosy psikhologii 5, 61 - 72

Aidarova, L.I. (1966) Formirovanie lingvistitšeskogo otnošenija k slovu u mladših školnikov (Developing the linguistic relation to the word in junior school children) In: Elkonin D.B., Davyduv, V.V. (Eds) Vozrastnye vozmožnosti usvoenija znanij Moscow: Prosveštšenie

Aidarova, L.I. (1969a) Rebenok, jazyk i gumanitarnoe znanie (The child, language, and humanistic knowledge) Sovetskaja pedagogika 6, 25 - 34

Aidarova, L.I. (1969b) Problemy razvitija v situatsii experimental-nogo obutsenija (Problems of development on the basis of experimental education) In: Eksperimentalnye issledovanija po problemam perestroiki natšalnogo obutšenija. Materialy I simpoziuma. Tbilisi

Aidarova, L.I. (1970) Osnovnye linii razvertivanija kursa rodnogo jazyka v mladših klassah (Basic directions of the development of teaching mother tongue in junior classes) In: Kostjuk, G.S. (Ed) Obutšenie i razvitie mladših školnikov Kiev

Aidarova, L.I. (1974) Nekotorye psihologitšeskie voprosy soderžanija i strktury utšebnika (Some psychological problems of the contents and structure of the textbook) In: Eksperimentalnye issledovanija po problemam perestroiki natšalnogo obutšenija Materialy II simpoziuma Tbilisi

Aidarova, L.I. (1976) O nekotoryh psihologitšeskih aspektah postroenija kursa rodnogo jazyka (On some psychological aspects of the structure of the course in mother tongue) Voprosy psikhologii 3, 34 - 46

Aidarova, L.I., Geršina, N.I. (1977) Orientatsija v strukture slova i izutšenie orfografii (The structure of the word and study of writing) In: Davydov, V.V. (Ed) Psihologitšeskie problemy utšebnoj dejatelnosti školnika Moscow: Sovetskaja Rossija

Aidarova, L.I., Gorskaja, L.J., Tsukerman, G.A. (1976) Psihologitšeskie problemy vvedenije pervoklassnikov v situatsiju issledovanija rodnogo jazyka (Psychological problems of introducing elements of research for first-graders in mother tongue) Voprosy psikhologii 2, 40 - 51

Aidarova, L.I., Saveljeva, T.M. (1972) O vozmožnosti ovladenija mladšimi školnikami metodom lingvistitšeskogo analiza (On the possibilities mastering the method of linguistic analysis by junior school children) Voprosy psikhologii 3, 59-69

Arsenjev, A.M. (1970) Škola i sovremennaja nautšno-tehnitšeskaja revoljutsija (The school and the modern scientific-technical revolution) Moscow: Znanie

Bellack, A. & Davitz, J.R. (1963) The language of the classroom USOE, Cooperative Research Project No. 2023. New York: Teachers College, Columbia University.

Bellack, A. & al. (1966) The language of the classroom. New York: Teachers College Press.

Bertsfai, L.V. (1969) Nekotorye sposoby izutsenija stroenija utšebnoj dejatelnosti mladših školnikov (Some ways of studying the structure of learning activities of junior schoolchildren) In: Eksperimentalnye issledovanija po problemam perestroiki natšalnogo obutšenija p 126 - 151

Bertsfai, L.V. (1974) Zavisimost vida obobštšenija ot haraktera zadatš (Depedence of the type of geralizations on the nature of tasks) in Eksperimental'nye issledovanija po problemam usoveršenstvonanija utsebnovospitatelnogo protsessa v natšalnyh klassah i podgotovka dety k skole No 1 Tbilitsi: TGU.

Bertsfai, L.V. (1974) Stroenie utšebnoj zadatsi i diagnostiki utšebnoj dejatelnosti (The structure of learning tasks and diagnosis of learning activity) In: Davydov, V.V., Feldstein, D.I. (Eds) Psihologopedagogitseskie problemy obutšenija i vospitanija Part I p 31 - 46 Dušanbe: Doinish

Block, J.H. (1971) Introduction to Mastery learning: theory and practice. In Block, J.H. (ed.) Mastery learning: theory and practice: New York: Holt, Rinehart and Winston, p. 2 - 12.

Bodanskij, F.G. (1967) O vozmožnosti usvoenija algebraitšeskogo sposoba rešenija zadats mladšimi školnikami (On the possibility of learning the algebraic method of solving tasks by junior schoolchildren) Voprosy Psihologii 3, 101 - 109

Bodanskij, F.G. (1969) Formorivanie algebraitšeskogo sposoba rešenija zadats u mladših školnikov (Developing the algebraic method of solving tasks in junior schoolchildren) In: Davydov, V.V. (Ed) Psihologitšeskie vozmožnosti mladših školnikov v usvoenii matematiki Moscow: Prosveštšenie

Burmenskaja, G.V. (1976) Ponjatie invariantnosti i problema psihitšeskogo razvitija rebenka (The concept of ivariantness and mental development of the child) Voprosy psikhologii 4, 103 - 112

Callewaert, S. & Nilsson, B.A. (1974) Samhället, skolan och skolans inre arbete. Lunds universitet, sociologiska institutionen. Projekt Skolklassen som socialt system, rapport nr. 2.

Callewaert, S. & Nilsson, B.A. (1980) Skolklassen som socialt system: lektionsanalyser. Lund: Lunds bok och tidskrifts AB.

Davydov, V.V. (1962) Opyt vvedenija elementov algebry v natšalnoj škole (Experiences of introducing elements of algebra in elementery school) Sovetskaja pedagogika 8, 34 - 46

Davydov, V.V. (1964) Ob izmenenie soderžanija natšalnogo obutšenija (On changing the contents of primary teaching) Sovetskaja pedagogika 4, 76 - 88

Davydov, V.V. (1966a) Svjaz teorii obobštšenija s programmiirovaniem obutšenija (The relation of theory of generalization to programming of learning) In: Issledovanija myšlenija v sovetskoj psihologii Moscow: Nauka

Davydov, V.V. (1966b) Logiko-psihologitšeskie problemy natšal'noj matematiki kak utšebnogo predmeta (Logico-psychological problems of elementary mathematics as school subject) in Elkonin D.B., Davydov, V.V. Vorzrastnye vozmožnosti usvoenija znanij Prosveštšenie Moskva.

Davydov, V.V. (1966c) Psihologitšeskie osobennosti "dotšislovogo" perioda obutšenija matematiki (Psychological characteristics of the "prenumber" period of teaching matematics) in Elkonin, D.B., Davydov, V.V. (Eds) Vozrastnye vozmožnosti usvoenija znanij Moscow: Prosveštšenie

Davydov, V.V. (1968) K probleme sootnošenija abtraktnyh i konkretnyh znanij v obutšenii (On the relationship between abstract and concrete knowledge in primary learning). Voprosy psikhologii 6, 34 - 49

Davydov, V.V. (1969a) Problemy izutšenija svjazi obutšenija i umstvennogo razvitija detej (Theoretical problems of studying the relation between education and mental development of schoolchildren) In Eksperimentalnye issledovanija po problemam perestroiki natšalnogo obutšenija p. 667 - 700 Tbilisi.

Davydov, V.V. (1969b) Psihologitšeskij analiz dejstvija umnoženija (The psychological analysis of multiplying) In: Davydov, V.V. (Ed) Psihologitšeskie vozmožnosti mladših školnikov v usvoenii matematiki Moscow: Prosveštšenie

Davydov, V.V. (1972) Vidy obobštšenija v obutšenii (Types of generalizations in teaching) Pedagogika Moskva

Davydov, V.V. (1976) K probleme opredeljajuštšej roli utšebnoj dejatel'nosti v formirovanii teoretitšeskogo myšlenija detej (On the determining role of teaching-learning activity on development of children's theoretical thinking) A paper presented at 26th international congress in psychology in Paris.

Davydov, V.V. (1976) Osnovnye problemy vozrastnoj i pedagogigitšeskoj psihologii na sovremennom etape razvitija obrazovanija (Basic problems of developmental and pedagogical psychology at the present stage of education) Voprosy psihologii No 4, 3 - 1

Davydov, V.V. (1977) Psihologitšeskie problemy vospitanija i obutšenija podrastajuštšego pokolenija (Psychological problems of upbringing and education of the rising generation) Voprosy psikhologii 5, 35 - 46

Davydov, V.V. (1980) Analysis of psychologico-pedagogical principles of learning. Studies psychologica 22, 1, 41 - 4 41 - 49

Davydov, V.V. & Andropov, V.P. (1979) Psihologitšeskie uslovija proishoždenija idealnyh dejstvij (Psychological conditions of the origin of mental actions) Voprosy psikhologii 5, 40 - 54

Davydov, V.V. & Markova, A.K. (1978) Razvitie myšlenija v škol´nom vozraste (Development of thinking at school age) in Printsip razvitii v psihologii Moskva. Nauka

Davydov, V.V. & Tsevetskovits, Z. (1969) O predmetnyh istotšnikah ponjatija drobi (On the objective origins of the concept of fraction) In: Davydov, V.V. (Ed) Psihologitšeskie vozmožnosti mladših školnikov v usvoenii matematiki Moscow: Prosveštšenie

Dreeben, R. (1973) The school as a workplace. In Travers, R. (ed.) Second handbook of research on teaching. Chicago: Rand McNally, p. 450 - 473.

Dunkin, M.J. & Biddle, B.J. (1974) The study of teaching. New York: Holt, Rinehart and Winston.

Dusavitskij, A.K. & Portnaja, E.A. (1977) Ob osobennostjah razvitija motivov utšenija mladših školnikov (Special features of the development of learning motivation in junior school children) In: Davydov, V.V. (Ed) Psihologitšeskie problemy utšebnoj dejatelnosti školnika Moscow: Sovetskaja Rossija

Elkonin, D.B. (1969) Svjaz obutšenija i psihologitšeskogo razvitija detej (Relation of education to the mental development of children) In: Eksperimentalnye issledovanija po problemam perestroiki natšalnogo obutšenija p 243 - 278 Tbilisi

Elkonin, D.B. (1974) Psihologija obutšenija mladšego škol'nika Znanie Moskva (The psychology of teaching young pupils)

Elkonin, D.B. & Davydov, V.V. (1966) (Eds) Vozrastnye vozmožnosti usvoenija znanij (Age-related possibilities of adopting knowledge) Moscow: Prosveštšenie

Faraponova, E.A. (1977) Obutšenie mladših školnikov rabote s prostejšimi tšertežami na urokah politehnitšeskoj trudovoj podgotovki (Teaching junior school children the work with sketchies in the lessons of polytechnical training) In: Davydov, V.V. (Ed) Psihologitšeskie problemy utšebnoj dejatelnosti školnika. Moscow: Sovetskaja Rossija

Faraponova, E.A. & Averin, A.M. (1979) Issledovanie vozmožnostej formirovenija teoretitšeskih obobštšeniij v protsesse rešennija tehnitšeskih zadats (The study of possibilities for building up the theoretical generalizations by solving technical tasks) Voprosy psikhologii 4, 45 - 54.

Flanders, N.A. (1970) Analyzing teacher behavior. Reading, Mass.: Addison-Wesley.

Feldstein, D.I. (1979) Psihologitšeskaja rol veduštših tipov dejatelnosti v formirovanii litšnosti rebenka (The psychological role of the leading type of activity in the development of the personality of the child) Voprosy psikhologii 5, 151 - 164

Fridman, L.M. (1969) Osobennosti vvedenija ponjatija ob imenovannyh tšislah v mladših klassah (On the special features in the introducing the concept of denominate number in junior grades) In: Davydov, V.V. (Ed) Psihologitšeskie vozmožnosti mladših školnikov v usvoenii matematiki. Moscow: Prosveštšenie

Guzman, R.J. (1980) Rol sovmestnoj dejatelnosti v rešenii utšebnyh zadatš (Importance of simulation of common activity in solving instructional tasks) Voprosy psikhologii 3, 133 - 136

Hakkarainen, P. (1979b) (toim.) Näin naapurissa. Neuvostoliiton kasvatustutkimuksen ja koulutusjärjestelmän esittelyä. (The way our neighbours do it. Some aspects of the Soviet educational research and educational system) Jyväskylän yliopisto. Kasvatustieteiden tutkimuslaitos. Selosteita ja tiedotteita 119/1979.

Hakkarainen, P. (1979a) Mitä on kehittävä opetus. (Development orientation in teaching) Jyväskylän yliopisto. Kasvatustieteiden tutkimuslaitos. Selosteita ja tiedotteita 128/1979.

Hakkarainen, P. (1980) Teaching process and theoretical generalization In Hakkarainen P. (Ed) Theoretical and practical aspects of the curriculum. University of Jyväskylä. Institute for Educational Research. Bulletin No 135, 79 - 92.

Henry, J. (1963) Culture against man. New York: Random House.

Hoetker, J. & Ahlbrand, W.P. (1969) The persistence of recitation. American Educational Research Journal 6:2, 145 - 167.

Holt, J. (1964) How children fail. New York: Pitman.

Ho Ngok Daj (1971) O vozmožnosti usvoenija mladšimi školnikami algebraitšeskoj operatsii (On the possibilities of learning albebraic operations by junior schoolchildren) Voprosy psikhologii 1, 80 - 89

Iljenkov, E.V. (1960) Dialektika abstraktnogo i konkretnogo v "Kapitale" Marksa (Dialsctics of the abstract and the concrete in Marx' "Kapital") Moscow: AN SSSR

Iljenkov, E.V. (1967) Problema abstraktnogo i konkretnogo (The problem of the abstract and the conrete) Voprosy filosofii 9, 55 - 65

Iljenkov, E.V. (1979) Problema idealnogo (The problem of the ideal) Voprosy filosofii 6, 128 - 140;, 7, 145 - 158

Jackson, P.W. (1968) Life in classrooms. New York: Holt, Rinehart and Winston.

Jatsevits, V.N. (1977) Formirovanie biologitšeskih ponjatij na urokah biologii v 5-m klasse srednej školy (Developing biological concepts in lessons of biology in the fifth grade of the school) In: Davydov, V.V. (Ed) Psihologitseskie problemy utšebnoj dejatelnosti školnika Moscow: Sovetskaja Rossija

Jelisejeva, L.N. (1977) Put' ovladenija teoretitšeskimi znanijami v natšalnoj škole (The methods of mastering theoretical knowledge in elementary school) In: Davydov, V.V. (Ed) Psihologitšeskie problemy utšebnoj dejatelnosti školnika Moscow: Sovetskaja Rossija

Jelisejeva, L.N. & Garšina, N.I. (1977) Metody izutšenija russkogo jazyka v natšalnoj škole (The methods of studying the russian language in elementary school) In: Davydov, V.V. (Ed) Psihologitšeskie problemy utšebnoj dejatelnosti školnika Moscow: Sovetskaja Rossija

Kalpinina, Z.A. & Tšistova, L.P. (1978) Dnevnik nabludenij nad priorodoj i trudovoj dejatel'nost'ju tšeloveka (Observation of nature and work by pupils using the diary method) Prosveštšenie Moskva.

Klafki, W. (1976) Zum Verhältnis von Didaktik und Methodik. Zeitschrift für Pädagogik 22:1, 77 - 94

Korostelev, A.J. (1978) Osobennosti razvitija eksperimentalno-praktitšeskoj dejatelnosti u školnikov (Special features of the development of experimental-practical action in school children) In: Issledovanija po problemam vozrastnoj i pedagogitšeskoj psihologii 54 - 60 Moscow

Korostelev, A.J. (1980) Psihologitšeskie osobennosti organizatsii sovmestnogo utšebnogo dejstvija školnikov (Psychological aspects of the organization of common learning activity in school-children) Voprosy psikhologii 4, 112 - 117

Kounin, J.S. (1970) Discipline and group management in classroom. New York: Holt, Rinehart and Winston.

Kravtsov, G.G. (1976) Nekotorye osobennosti utšebnoj dejatelnosti mladših podrostkov (Some special features of the learning activity in young teenagers) In: Eksperimentalnye issledovanija po problemam pedagogitšeskoj psihologii Vol 2 130 - 140 Moscow

Kravtsov, G.G. (1976) Nekotorye psihologitšeskie osobennosti utšebnoj dejatelnosti mladših podrostkov (Some psychological features of learning activity of junior teenagers) In: Eksperimentalnye issledovanija po problemam pedagogitšeskoj psihologii p 130 - 140

Kravtsov, G.G. (1977) Psihologitšeskie osobennosti utšebnoj dejatelnosti mladših podrostkov (Psychological features of learning activity in younger teenagers) Moscow

Kuzina, N.P. & Kolmakova, M.N. (1977) (Eds) Sovetskaja skola na sovremennom etape (The Soviet School Today) Moscow: Pedagogika

Kvale, S. (1976) The psychology of learning as ideology and technology. Behaviorism 4:1, 97 - 116

Logvinova, T.L. (1977) O probleme povyšenija urovnja prepodovanija utšebnyh predmetov estestvennonautšnogo tsikla (On the problems of improving the level of teaching natural sciences as school subjects) In: Davydov, V.V. (Ed) Psihologitšeskie problemy utšebnoj dejatelnosti školnika Moscow: Sovetskaja Rossija

Louhisola et al (1975) Historian maailma 5 (The world of history) Helsinki: Otava

Lundgren, U.P. (1977) Model analysis of pedagogical processes. Lund: Liber.

Lundgren, U.P. (1979) Att organisera omvärlden. Stockholm: Liber.

Maksimov, L.K. (1979) Zavisimost razvitija matematitšeskogo myšlenija školnikov ot haraktera obutšenija (Dependance of the development of mathematical thinking in school children on the character of teaching) Voprosy psikhologii 2, 57 - 64

Marx, K. (1967) Capital. Vol. 1. New York: International Publishers

Markova, A.K. (1966) Psihologitšeskie predposylki vvedenija rebenka v sintaksis rodnogo jazyka (Psychological prerequisities guiding the child to the syntax of mother tongue) In: Elkonin D.B., Davydov V.V. (Eds) Vozrastnye vozmožnosti usvoenija znaniij. Moscow: Prosveštšenie

Markova, A.K. (1968) Psihologitšeskie voprosy usvoenija stilistiki v škole (Psychological problems of learning the theory of style at school) Voprosy psikhologii 5, 22 - 35

Markova, A.K. (1969) O razvivajuštšem effekte nekotoryh prikladnyh znanij po jazyku (On developing effects of some applied knowledge of the language) In: Eksperimentalnye issledovanija po problemam perestroiki natšalnogo obutšenija. Materialy I simpoziuma Tbilisi

Markova, A.K. (1970) Osobennosti utšebnoj dejatelnosti školnikov pri usvoenii rodnogo jazyka (Special features of the learning activity of pupils in the study of mother tongue) In: Kostjuk, G.S. (Ed) Obutšenie i razvitie mladših školnikov Kiev

Markova, A.K. (1971) Usvoenie školnikami kommunikativnoj funktsii jazyka (The learning of the communicative function of the language) Voprosy psikhologii 4, 42 - 55

Markova, A.K. (1973) Periodosatsija retševogo razvitija (The periods of the development of the speech) Voprosy psikhologii 6, 11 - 20

Markova, A.K. (1974) Psihologija usvoenija jazyka kak sredstava obštšenija (The psychology of learning language as means of communication) Moscow: Pedagogika

Markova, A.K. (1977) Psihologitšeskie kriterii effektivnosti utšebnogo protsessa (Psychological criteria of the effeciancy of learning process) Voprosy psikhologii No 4, 40 - 51

Markova, A.K. (1978) Motivatsija utšebnoj dejatelnosti školnika (The motivation of the learning activity in pupils) Voprosy psikhologii 3, 137 - 142

Markova, A.K. (1979) Problema formirovanija motivatsii utšebnoj dejatelnosti (Shaping problem of motivation in educational activity) Sovetskaja pedagogika 11, 63 - 71

Markova, A.K. (1980) Puti issledovanija motivatsii utšebnoj dejatelnosti školnikov (Ways of investigating the learning motivation in school-children) Voprosy psikhologii 5, 47 - 59

Markuševitš, A.I. (1973) Soveršenstvovanie obrazovanija v uslovijah nautšnotehnitšeskoj revoljutsii (Improving the education at the stage of scientific- technical revolution) In: Problemy sotsialistitšeskoj pedagogiki Moscow: Pedagogika

Matis, T.A. (1976) Nekotorye sposoby formirovanija sovmestnoj utšebnoj dejatelnosti utsaŽtŽihsja v srednej škole (Some methods of forming common learning activity in pupils) In: Eksperimentalnye issledovanija po problemam pedagogitšeskoj psihologii Vol 2 93 - 100. Moscow

Matis, T.A. (1977) Psihologitšeskie osobennosti organizatsii sovmestnoj utšebnoj dejatelnosti školnikov (Psychological features of organizing common learning activity in pupils) In Davydov V.V. (Ed) Psihologitšeskie problemy utšebnoj dejatelnosti školnika. Moscow: Sovetskaja Rossija

Mikulina, G.G. (1968) O sootnošenii tsifrovoj i bukvennoj simvoliki pri obutšenii rešeniju arifmetitšeskih zadats (On the correlations of number and letter symbolics in teaching to solve arithmetic tasks) Voprosy psikhologii 1, 63 - 71

Mikulina, G.G. (1969) Psihologitšeskie osobennosti rešenija zadats s bukvennymi dannymi (Psychological characteristics of solving tasks with letter symbolics) In: Davydov, V.V. (Ed) Psihologitšeskie vozmožnosti mladših školnikov v usvoenii matematiki. Moscow: Prosveštšenie

Minskaja, G.I. (1966) Formirovanie ponjatija tšisla na osnove izutšenija otnošenija velitšin (The formation of number concept on the basis of analyzing relations of quantities) In Elkonin, D.B., Davydov, V.V. (Eds) Vozrastnye vozmožnosti usvoenija znanij. Moscow: Prosveštšenie

Minskaja, G.I. (1968) Ob usvoenii obobštšennyh sposobov rešenija arifmetitšeskih zadatš mladšimi školnikami (On the learning of generalized method of solving arthmetic tasks by junior schoolchildren) Voprosy psikhologii 2, 26 - 37

Minskaja, G.I. (1969) Formirovanie obobštšennyh sposobov rešeniia zadatš (Forming a generalized method of solving tasks) In: Davydov, V.V. (Ed) Psihologitšeskie vozmožnosti mladših školnikov v usvoenii matematiki. Moscow: Prosveštšenie

Morine, G. (1976) A study of teacher planning. Beginning Teacher Evaluation Study. Technical Report Series, Special Study C. San Francisco, Ca.: Far West Laboratory for Educational Research and Development

Nikulina, T.V. (1978a) K probleme logiko-psihologitšeskogo obosnovanija soderžanija školnogo kursa istorii (On the problem of logico-psychological grounds of the contents of school course in history) Novye issledovanija v psihologii 2, 33 - 36

Nikulina, T.V. (1978b) Psihologitšeskie osobennosti myšlenija školnikov pri usvoenii istoritšeskih ponjatij (Psychological features of pupil's thinking in the learning of the concepts of history) Moscow: APN NIIOPP

Nikulina, T.V. (1978c) K probleme formirovanija istoritšeskogo myšlenija školnikov (On the problem of developing historical way of thinking in pupils. In: Psihologitšeskie problemy protsessa obutšenija mladših školnikov. Moscow: APN NIIOPP

Nikulina, T.V. (1978d) Psihologitšeskie osobennosti znanij i myšlenija utšaštšihsja 5 - 8 klassov pri usvoenii istorii (The psychological features of knowledge and thinking in pupils in the grades 5 - 8 in studies of history) In: Davydov, V.V. (Ed) Osnovnye problemy obštšej, vozrastnoj i pedagogitšeskoj psihologii

Nosatov, V.T. (1976) Ob osobennostjah analiza pri teoretitšeskom obobštšenii (On spesific features of analysis in theoretical generalization) In: Eksperimentalnye issledovanija po problemam pedagogitšeskoj psihologii p 149 - 158

Nosatov, V.T. (1978) Psikhologitšeskaja harakteristika analiza kak osnovy teoretitšeskogo obobštšenija (Psychological characteristics of analysis as a basis of theoretical generalization), Voprosy psikhologii 4, 46 - 53

Nuthall, G. & Snook, I. (1973) Contemporary models of teaching. In Travers, R. (ed.) Second handbook of research on teaching. Chicago: Rand McNally, p. 47 - 76

Obuhova, L.F. (1-72) Etapy razvitija detskogo myšlenija (Developmental stages in children's thinking) Moscow: MGU

Otte, M. (1976) Die didaktischen Systeme von V.V. Davydov und L.V. Zankov. Demokratische Erziehung 2, 2, 198 - 212

Ožiganova, G.I. (1973) Stroenie utšebnoj dejatelnosti školnikov pri usvoenii znanij na osnove teoretitšeskih obobštšenij (The structure of schoolchildren's learning activity when assimilating knowledge on the basis of theoretical generalizations) Voprosy Psikhologii 2, 77 - 88

Ozolin, G.A. (1977) Psihologitseskij analiz natšalnyh etapov igry na muzykalnom instrumente (The psychological analysis of the first stages of playing on musical instruments) In: Davydov, V.V. (Ed) Psihologitšeskie problemy utšebnoj dejatelnosti školnika. Moscow: Sovetskaja Rossija

Pomomarjev, J.A. (1964) Issledovanija vnutrennogo plana dejstvij (An investigation of the inner plan of action), Voprosy psikhologii 6, 65 - 77

Ponomarjev, J.A. (1967) Znanie, myšlenie i umstvennoe razvitie (Knowledge, thinking and intellectual development) Moscow: Prosvestsenie

Puškina, T.A. (1980) Nekotorye printsipy konstruirivanija kompleksa metodik dlja issledovanija motivatsii utsebnoj dejatelnosti (Some principles of constructing a set of methods in study of motivation in learning activity) Novye issledovanija v psihologii 2, 77 - 82

Repkin, V.V. (1976a) O ponjatii utsebnoj dejatelnosti (On the concept of learning activity) Vestnik Harkovskogo universiteta. Psihologija No 132

Repkin, V.V. (1976b) Stroenija utšebnoj dejatelnosti (The structure of learning activity) Vestnik Harkovskogo universiteta. Psihologija No 132

Report of the Committee on Comprehensive School Curriculum (1970) Reports of Committees A4 and A5. Helsinki: Valtion painatuskeskus.

Rodionova, L.G. (1970) Nekotorye voprosy testirovanie urovnja usvoenija grammatitšeskih znanij v škole (Some problems of testing the mastery of grammatical knowledge at school) In: Kostjuk, G.S. (Ed) Obutšenie i razvitie mladših školnikov. Kiev

Rogers, C. (1969) Freedom to learn. Boston: Houghton Mifflin.

Rubtsov, V.V. (1975) Psihologitšeskie osobennosti vvedenija školnikov v oblast teoretitšeskih ponjatij (na materiale fiziki) (On the psychological features of introducing the area of theoretical concepts for pupils (with the material of physics) Voprosy psikhologii 5, 97 - 108

Rubtsov, V.V. (1977) O logiko-psihologitšeskih predposylkah postroenija eksperimentalnoj programmy po fizike vsrednej skole (On the logic-psychological prerequisities of constructing experimental program in physics in the comprehensive school) In: Davydov, V.V. (Ed) Psihologitšeskie problemy utšebnoj dejatelnosti školnika Moscow: Sovetskaja Rossija

Rubtsov, V.V. (1978) K voprosy o metodah issledovanija sovmestno-raspredelennoj utšebnoj dejatelnosti školnikov (On the research methods of common learning activity in pupils) In: Psihologitšeskie problemy protsessa obutšenija mladših školnikov 200 - 202 Moscow

Rubtsov, V.V. (1980) Rol kooperatsii v razvitii intellekta detej (Role of cooperation in development of intellect in children) Voprosy psikhologii 4, 79 - 89

Šagalova, L.E. (1977) Ovladenie ponjatiem sinonimii detmi mladših klassov (The mastery of the concept of synonym by junior school children) In: Davydov, V.V. (Ed) Psihologitšeskie problemy utšebnoj dejatelnosti školnika Moscow: Sovetskaja Rossija

Sarfatti-Larson, M. (1969) Proletarianization and educated labor. Theory and Society 9:1, 131 - 176

Skatkin, M.N. (1978) Prirodavedenie (Introduction to the natural sciences) 4 Prosveštšenie. Moskva

Skatkin, M.N. & Krajevskij, V.V. (1978) (Eds) Katšestvo znanij utšaštšihsja i puti ego soveršenstvovanija (The quality of knowledge and the means of their improving) Moscow: Pedagogika

Smith, L.M. & Geoffrey, W. (1968) The complexities of an urban classroom. New York: Holt, Rinehart and Winston.

Spektor, R.I. (1978) K probleme organizatsii orientirovotšnoj osnovy sportivnogo soveršenstvovanija (On the problem of organizing orientating basis in the improving of athletic training) In Davydov, V.V. (Ed) Osnovnye problemy obštšej, vozrastnoj i pedagogitšeskoj psihologii. Moscow: NIIOPP

Taba, H. (1964) Thinking in elementary school children. USOE, Cooperative Research Project No. 1574. San Francisco, Ca.: San Francisco State College.

Tesconi, C.A. & Morris, V.C. (1972) The anti-man culture. Urbana: University of Illinois Press.

Travers, R.M.W. (1973) Educational technology and related research viewed as a political force. In Travers, R. (ed.) Second hadbook of research on teaching. Chicago: Rand McNally, p. 979-996.

Tsehanskij, V.M. (1978) Vosprijatie otdelnyh urovnej muzykalnogo proizvedenija (The perception of different levels of a musical composition) In: Davydov, V.V. (Ed) Osnovnye problemy obštšej, vozrastnoj i pedagogitseskoj psihologii. Moscow: APN NIIOPP

Tsukerman, G.A. (1977) Otkrytie mladšimi školnikami zakonov postroenija poetitšeskogo teksta (Revealing the laws of the structure of poetic texts by junior school children) In: Davydov, V.V. (Ed) Psihologitšeskie problemy utšebnoj dejatelnosti školnika. Moscow: Sovetskaja Rossija

Tsukerman, G.A. (1980) Kollektivno-raspredelennaja forma resenija utsebnyh zadats (The collective form of solving instructional tasks) Novye issledovanija v psihologii 2. 52-55

Vahnjanskaja, I.L. (1977) Psihologitšeskij analiz nyne dejstvujuštših školnyh programm po muzyke (The psychological analysis of the curriculum in musics at school today) In: Davydov, V.V. (Ed) Psihologitšeskie problemy utšebnoj dejatelnosti utšenika. Moscow: Sovetskaj Rossija

Vygotski, L.S. (1956) Izbrannye psihologitšeskie issledovanija (Collected works on psychology) APN SSSR Moskva.

Vygotski, L.S. (1962) Thought and language. Cambridge: The MIT Press and Wiley.

Zaharova, A.V. (1977) Formirovanija samootsenki v utšebnoj dejatelnosti (The formation of self evaluation in the learning activity) In: Davydov, V.V. (Ed) Psihologitšeskie problemy utšebnoj dejatelnosti školnika. Moscow: Sovetskaja Rossija

Zahorik, J.A. (1975) Teachers' planning models. Paper presented at the meeting of the American Educational Research Association, Washington, D.C., April 1975.

Zak, A.Z (1974) Harakteristika eksperimentalnoj metodiki po izutseniju osobennnostej rešenija zadatš na osnove teoretitšeskogo obobšenija (Characteristic of experimental methods in studying special features of task solving on the basis of theoretical generalization) In: Davydov, V.V., Feldstein, D.I. (Eds) Psihologo-pedagogitšeskie problemy obutšenija i vospitanija Part I p 105-114. Dušanbe: Doinish

Zak, A.Z. (1976) Modelirovanie sobstvennogo sposoba dejstvija kak neobhodimaja predposylka teoretitšeskogo rešenija zadatš (The modelling ones' own activities as necessary condition for the theoretical solution of tasks) In: Eksperimentalnye issledovanija po problemam pedagogitšeskoj psihologii p 169-175. Moscow

Zak, A.Z. (1977a) K voprosu o razvitii myšlenija u školnikov (On the problem of the development of thinking in pupils) In: Davydov, V.V. (Ed) Psihologitšeskie problemy utšebnoj dejatelnosti školnika. Moscow: Sovetskaja Rossija

Zak, A.Z. (1977b) Nekotorye metody diagnostiki intellektualnogo razvitija školnikov (Some methods of diagnosing the intellectual development of pupils) In: Davydov, V.V. Psihologitšeskie problemy utšebnoj dejatelnosti školnika Moscow: Sovetskaja Rossija

Zak, A.Z. (1978) Eksperimental'noe izutšenie refleksii u mladših škol'nikov (An experimental study of reflection in junior schoolchildren), Voprosy psikhologii 2, 102-110

Zak, A.Z. (1980) Diagnostika osnyvnyh komponentov teoretitšeskogo myšlenija (The diagnosis of basic components in theoretical thinking) In: Psihodiagnostika i škola. Tallin

Zankov, L.V. (1968) Didaktika i žizn (Teaching and life) Moscow: Prosveštšenie

Zankov, L.V. (1974) (Ed) Obutšenie i razvitie (Teaching and development) Moscow: Pedagogika

Zolotyh, L.K. (1978) Ob izutšenii motivov v svjazi s soderžatelnymi harakteristikami utšebnoj dejatelnosti (On the relations between motivation and contextual characteristics of learning activity) In: Davydov, V.V. (Ed) Osnovnye problemy obštšej, vozrastnoj i pedagogitšeskoj psihologii. Moscow

APPENDIX I

FROM THE CRADLE OF CULTURE AND COMMUNITY LIFE IN THE NEAR EAST

(Louhisola, Pajunen, Niemi, Historian maailma 5,
Tekstiosa, s. 7 - 9)

For hundreds of thousands of years man lived a very primitive life. Gradually, however, man began to develop He learnt how to defeat nature.

1.1.
THE HISTORY OF MAN IS LONG

Primitive man

It is not possible to say exactly when the first manlike creatures appeared on earth. We can, however, say that it was a very, very long time ago, even hundreds of thousands of years ago. If we had a telescope with which we could look far back in time, we would perhaps see there behind the lenses the primitive man carrying out his everyday chores. We would see a nearly naked, long-armed creature with

bent knees digging the ground with a stick. What is he looking for? Food, because the primitive man ate roots and fruit from the trees in the forest as well as berries. He slept in caves or caverns, until he learnt to make huts from tree trunks and grass. In the very early times people did obviously not live in one place, but probably spent their nights every here and there. Actually the primitive man was only one of the animals.

FIRE AS MAN' S SERVANT

At some stage man took the decisive step that made him superior to animals. He learnt to make use of fire. Man had probably got acquainted with fire when lightning had set fire to forests and grass. With time the primitive man then learnt to tame fire for his campfire and to keep it alive in a hollow

A very important stage was when man learnt to cultivate land.

The prehistoric period in the history of mankind ended when man learnt to write and read. This happened about 5000 years ago.

in the ground under sods. At some point man also learnt to make a fire on his own.

The learning of how to make a fire changed man's whole life dramatically. Man began to live more permanently in one place. Food also became more varied when man started to cook meat with the aid of fire. Gradually all kind of objects indicating habitation were gathered around the site of the campfire, such as weapons, tools and earthenware vessels.

ARCHEOLOGICAL FINDINGS

People of later times have discovered these early dwelling places that have often been left under thick layers of earth. Findings that contain objects or parts of them from such ancient dwelling places are called archeological findings. The period of time about which we have received information only on the basis of such findings of object is called *the prehistoric age*.

APPENDIX II

1.1.A THE HISTORY OF MAN IS LONG

1. There was life already a long time before man

_____ ☐☐

2. This whole complicated development process had taken place:

insects
fish
reptiles
saurians
primitive birds
mammoths

THUS THEY WERE:

_____ _____ _____

_____ _____ and MAMMOTHS. ☐☐

3. Last came the primitive man. He was nearly naked, had bent knees and was

_____ ☐☐

4. Thus man first appeared on earth
   A. hundreds of years ago
   B. thousands of years ago
   C. hundreds of thousands of years ago
   D. millions of years ago___ ☐☐

5. Where did the primitive man live?

_____ ☐☐

6. What new phenomenon did man probably get acquainted with during thunder storms?

_____ ☐☐

7. The most important invention made by the primitive man was

_____ ☐☐

8. With the aid of fire it was at first possible to prepare
   A. boiled food
   B. grilled food
   C. tastier food
   D. fried food _____ ☐☐

9. What are findings of ancient objects called?

_____ ☐☐

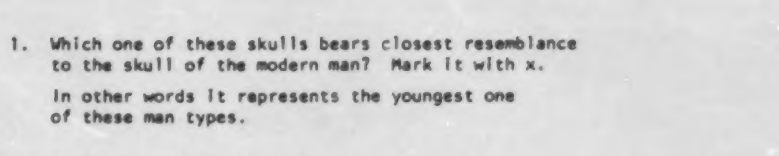
10. What is the period of time called about which we have received information only on the basis of object findings?

_____ ☐☐

1.1.8 THE HISTORY OF MAN IS LONG

1. Which one of these skulls bears closest resemblance to the skull of the modern man? Mark it with x.

   In other words it represents the youngest one of these man types.



R W C = Right, Wrong, Can't say

2. ☐ ☐ ☐ The making of a fire made man's diet even less varied. ☐☐

3. ☐ ☐ ☐ The learning of how to make a fire had the result that man started to settle down in own place. ☐☐

4. ☐ ☐ ☐ Man's food was probably saltless at the beginning. ☐☐

5. Tick the conceptions that are related to fire: ☐☐

☐ lightning	☐ forest fire
☐ vegetable food	☐ meat dishes
☐ campfire	☐ settling down
☐ a hollow in the ground	☐ grass fire

6. TELL a vivid story about the first meal the stone-age people cooked with the aid of fire. ☐☐

1.1.C THE HISTORY OF MAN LIS LONG

1. Man has lived on earth already for _____ years.

2. Since it was difficult to make a fire, man had to keep the fire alive for as long as possible. Where did he manage to maintain it?

_____

3. What kind of signs indicating habitation has been found around ancient sites of campfire?

_____

_____

_____

4. The development of man has been long. On the basis of archeological findings different types of man have been named after the places where they have been found. In the exercise below the different types of man have been listed from the oldest to the youngest.

FIND THE RIGHT CONTINENT AND COUNTRY FOR EACH TYPE OF MAN.

		CONTINENT	COUNTRY	
JAVA-man	more than	_____	_____	A) Asia
PEKING-man	600 000	_____	_____	B) Europe
HEIDELBERG-man	years ago	_____	_____	C) Africa R) France
RHODESIA-man	about 100 000	_____	_____	S) Germany
NEANDERTHAL-man	years ago	_____	_____	RH) Rhodesia
AURIGNAC-man	about 20 000	_____	_____	K) China
CRO-MAGNON-man	years ago	_____	_____	I) Indonesia

1.1.E THE HISTORY OF MAN IS LONG

1. Colour the picture.
2. Describe briefly but vividly what is happening in it.

(Louhisola, Pajunen, Niemi (1975) Historian maailma 5, Opiskeluosa s. 5 - 8)

Research on Teaching Activity in Hungary

by

Iven Felus

The research we have been conducting is designed to seek answers to two questions:

> What are the characteristics of successfull pedagogical activities?
>
> How can it be achieved that these features characterize the work of beginners in the teaching profession?

The endeavour to find an answer to the first question involves the analysis of the pedagogical activity and the second problem involves the elaboration of the content and methods of teacher education.

1. It is no mere coincidence that the two questions have been placed alongside one another. It is our conviction that no decision can be taken on the goals, content and organizational framework of teacher training without possessing accurate knowledge of the major techniques and content of the teaching profession. The endeavours, the objective of which is to give integrated instruction in the pedagogical subjects or, sometimes, the integration of theoretical and practical training in pedagogy, (efforts that have been increasingly apparent on the international scene and in Hungary, too, over the past two years or so), can only be regarded as having adequate foundations and can only be expected to be successful in the long run, if they are based on an analysis and definition of what is in fact necessary

for effective teaching. The social demands to be satisfied by the teacher and the school are incapable of offering directly an adequate basis for the determination of the necessary knowledge, skills and abilities; nor can the information accumulated by pedagogical and psychological science be the exclusive criterion of determining the content. Like in other professions, the knowledge, skill and abilities necessary for performing the actual activities must be regarded as being the objectives of training. With the assistance of the analysis of these activities the objectives can be defined to offer help in selecting the necessary elements from the sciences. Students graduating from teacher training institutions must possess knowledge and skills and abilities as well relating not only to pedagogy and psychology but also to communication theory, for example. In connection with this the questions can arise: what is the content to be acquired and what is the standard to be achieved in respect of the graduates knowledge? Only the analysis of the teaching activity can supply an answer to this question as well. It needs no social proof that the methods and organizational forms adopted in teacher training are also dependent on the replies to the above questions. The considerations listed here have made it necessary for us to coordinate the analysis of the teaching activity with the development of the methods of teacher education in our research, the goal of which is to contribute to the updating of teacher training.

International literature on the subject has also encouraged us to make such an approach in our research programme. There are similarities in our approach and that of the Soviet researchers above all Abdullina and Slastienin or some American researchers like Gage, Berliner, Borg and Rosenshine.[1.]

What we have discussed so far has been confined to considering the analysis of the teacher's activity as the prerequisite of teacher education as the main line of our research.

2. Some words must also be said about the methods we adopt in an effort to disclose the composite parts of the teacher's activity. Considering the fact that in the pedagogical process the task to be accomplished is to analyse the teacher's activity in his work with the students, observation can be accepted as the most adequate method. The most recent publications of the trend which was triggered off by the interaction analysis categories introduced by Flanders (and which elaborates objective observation methods and processes in increasing numbers and supplies ever more thoroughgoing and reliable results)has confirmed our conviction that the category systems providing for exact observation are equally useful for disclosing pedagogical reality, making an approach to the laws governing the process of instruction and education and for the description of the components of teacher's activity.[2]

3. After making this reference to the methodology of research, let us return to our first question which concers the characteristics of successful teaching activities, in other words: it raises the point of what is essential for a good teacher to know. It is a view frequently cropping up in the ranks of laymen or even in special literature that the exclusive condition for performing successful work is the teacher's adequate knowledge of his/her subject. The conclusions that can be drawn from this view are only too obvious: it is unnecessary to divert the students from studying science or their future profession by teaching them pedagogical subjects and subjecting them to pedagogical exercises.

According to another view the characteristic features and properties of his/her personality determine the extent to which his/her work can be successful. Here the conclusions that can be drawn are again quite obvious: the researchers' duty is to reveal the properties of the personality that are advantageous from the aspect of the teaching career and the teacher training institutions should select the applicants accordingly at the entrance examinations.

When we want to answer the question of the characteristics or conditions of successful teaching work the importance of the knowledge of the specific subject/s/ is beyond any doupt, nor can the essential role of personality be challenged. Our examination are designed to acquire information as to the content, character and role of pedagogical professional knowledge which the third area of possible studies.

We set out from Makarenko's well-know position that "one can be instructed to educate as well as to count, read, or work on the lathe or milling machine."[3]. Concerning the general formulation of the content necessary for teaching the mastery of teaching we can also rely on Makarenko who maintained that the acquisition of the "pedagogical trade" is, among other things, equivalent to the drilling of special knowledge and skills. In today's international literature on the subject the concept that the "pedagogical trade" is the assembly of knowledge and skills that can be determined, described and acquired, is gaining increasing ground.

Researchers belonging to different schools also agree that the "pedagogical trade" cannot be reduced to knowledge, rules and principles. It has been detected that knowledge of pedagogical theory by itself has no impact whatsoever on the actual teaching activity of teachers. Good teachers and bad teachers know very well what they ought to do, in other words, there are no differences between them in terms of their knowledge. It follows then that there is something more than the knowledge of pedagogy that is essential for doing successful teaching work.[4].

But what is the "something more" necessary for the teacher to be able to use his/her knowledge in the situations that occur in reality. In other words: what is the content of the pedagogical trade and what is the nature of the teaching activity? Quite conflicting views can be encountered in this field. According to the representatives of the so-called humanistic school the principal task to be accomplished by

teacher training is to promote the development of creative persons. The teachers trained under this scheme will be capable of adjusting their behavior to the students demands, the actual situations, tasks to be faced and the available methods quite flexibly. The advocates of this trend do not think it important to acquire specific skills and methods because they argue that they are invariably dependent on the goal, situation and students.[5]

Diametrically opposed to this approach is the idea that the mastery of technical skills is expected to lead to the development of effective teaching activity. According to this trend which developed at Stanford University in the 1960's the difficulties of beginners in the teaching profession stem from the fact that although they are familiar with the methods of successful work they are incapable as yet to translate this knowledge into practice since they are not experienced enough in practice to do so. The task is, therefore, to make sure that the elementary components of the activity, the pedagogical skills, are drilled to an extent that their use in given situation should pose no problem to the teacher at all. It follows from this that teachers, in general, know what they should do, but they are simply incapable of carrying out the given activity. For example, I know that I ought to put a question making the students think, but I fail to do so: or I know that I ought not to reply to the question I put immediately after finding that the student cannot answer it, nevertheless I answer the question, etc. This approach to teacher education has set the objective for the student teacher to use skills considered to be positive more often and try to ignore the negative ones in the course of teaching.

We completely agree that there are components of the teaching activity which can more or less be drilled and automated and which must be developed on purpose, but I want to note at this stage that it is not sufficient for the student teacher to use these elementary components frequently; it is also important when he/she uses them.

The representatives of another tendency emphasize the decision making element of the pedagogical activity which is concealed by the actual acts of execution. An exponent of this school, Shavelson.[6.] very convincingly shows that in the course of an action composed of a series of elements to be executed such as conversation between teacher and student the teacher must make a series of decisions. The selection of a certain question, asking a specific student to answer it etc. presumes decisions to have been taken. When making such a decision on several factors must be taken into account: the objective to be achieved, possible teaching actions, the standards of the students' knowledge, their personality, the size of the class, the expected results of the actions selected, and so on.

The majority of Soviet researchers (Kiselgof, Turbovskoy, Kuzmina, Spirin and Frumkin) also emphasize the importance of this element of decision making. For instance, Kiselgof considers the teaching activity as a series of problem-solving tasks.

In Turbovskoy's view 4 phases can be distinguished in tackling pedagogical problems: determination of the direction of the activity, analysis of the conditions, selection of the means and an operational stage.

4. On the basis of the synthesis of the tendecies listed above I considered it possible and necessary to outline a hypothetical model into which the elements of the activity necessary for pedagogical work can be fitted and on the basis of which the detailed and exact objectives and content of teacher education can be elaborated.

Figure 1. Stages of Pedagogical Activity

Nature of pedagogical activity / Stages pedagogical activity	Analysis	Decision making	Implementation
Planning (preparation)	Analysis of the curricula, requirements, textbooks, teaching aids and determination of the standards of the class.	Based on analysis the strategy of teaching along with the methods, aids and organizational forms to be adopted must be selected.	Producing the necessary aids, formulating the questions, elaborating a plan of the successive topics and syllabus for the lesson.
Instruction and education (interactive stage)	Detecting the interest and degree of fatique of the class along with checking the understanding of the individual concepts and the impact of the teacher's activity.	Determining the next action of teaching (e. g. putting questions, giving explanation, demonstration, etc) on the basis of the original plan and the results of analysis.	Formulating questions, praise, recognition of achievement, explanation demonstration, etc.
Evaluation	Analysis of relations between demands and student achievements, teacher's self-evaluation.	Is it possible to take a new section of the teaching material? What complementary instruction is needed by the class or the individuals? To what extent teaching should be modified to correspond to new teaching material? (regulation)	Designing and producing means of evaluation and measuring achievement.

Three stages of pedagogical activity are distinguished in the Figure. The planning stage which is called by some authors the pre-interactive, constructional or preparatory activity, the interactive stage which denotes the period of work performed along with the students and the last one is the stage of evaluation. In each of the three stages three types of activities must be performed, namely, analysis, decision making and implementation. Without aiming at completeness the Figure contains examples for the different kinds of activities in the individual stages. I believe that the one-sidedness of the approaches described earlier as well as the defects of a similar nature of the present practice can be eliminated if pedagogical activity is considered in this frame of interpretation. (For instance, appropriate emphasis is laid on analysis and decision making in the interactive stage, while in the stage of evaluation attention is called to the importance of regulation.) If the present content and methods of teacher education are compared with the above model, the areas that are possibly ignored will immediately come to the surface. In addition, it will also be possible to determine what is expedient to teach and in what orientation, what sort of knowledge can be used in more than one stage and, therefore can be considered as fundamentally important. Moreover, the nature of the activities reveals the goals to which the related exercises should lead.

In summarizing what has been discussed so far it can be concluded that the "pedagogical trade" and, accordingly, pedagogical training or preparation should not be confined to any of the stages or kinds of activity. As a rule, the teacher will find himself faced with a variety of situations involving analysis, decision making and execution in the stages of planning, interaction and evaluation and it follows that he must be prepared to be able to cope with such situations in the course of training. Student teachers must, therefore master certain knowledge, skills and abilities which must be developed in terms of analysis, decision

making and execution all of which can collectively enable them to perform successful work in the stages of planning, instructing and educating and evaluating.

5. At this point I feel I should outline, my views on the content of pedagogical skills and abilities. We began the elaboration of the system of skills and abilities by mapping and analysing relevant international literature. We attempted to find an answer to the problem of the types of skills and abilities the acquisition of which is regarded as the principal tasks of the major programmes of teacher education that have the objective of giving practical training for future teachers in pedagogy.

Despite the apparently wide variety and differences revealed by international literature in this respect there is agreement and similarity of opinions in respect of the skills that are of fundamental importance. These occur frequently and are comparatively well elaborated. Obviously, I cannot embark on the analysis, presentation of comparison of the individual programmes of skill development so I shall confine myself to simply listing the institutions and authors whose ideas we took into account when building up our own system. Of the Soviet authors let me mention in the first place Zasobina, Zimicheva, Leonova, Kuzmina, Kiselgof, Spirin and Frumkin;[7] as regards Western Europe I wish to mention the programmes elaborated by Stirling University and Ulster University and concerning the works published in the United States I rely on works by Weigand, Cooper and Turner besides the training system of Stanford University and Far West Laboratory. In this connection I must make special mention of the system developed at Sydney University under the leadership of Turney, a system embarking on the difficult job of classifying the skills.[8]

Based on special literature and on the results of our own analysis we classified pedagogical skills into nine groups on the grounds of hypothetical considerations.

Figure 2.

Figure 2. Groups of General Teaching Skills

Component Skills / Group of Skills	University of Stanford 1969	Far West Laboratory 1970	Walqent et al 1971	University of Stirling 1972-76	Brown, G. Microteaching 1975	Sydney Skills Classification System 1973	A General Catalog of Teaching Skills 1973	Classroom Teaching Skills. A Handbook 1977
Planning Skills			Assessing intellectual development stages of children Formulating performance objectives Sequencing instruction	Choice of lesson theme Specification of job objectives Structure of lessons Planning for feedback	Lesson planning (Defining instructional objectives, topic analysis, choosing the methods, planning the evaluation)		Defining skills Development skills Selecting skills Organizing skills	Instructional planning Writing instructional objectives
Lesson Presentation Skills	Creating student involvement			Variation	set Closure Teacher liveliness	Motivational skills		Lesson presentation skills
Questioning Skills	Questioning skills	Effective questioning (1., 3.) Thought questions (9.) Divergent thinking (20.)	Developing question - asking skills	Questioning for feedback Higher order questioning	Fluency in asking questions Lower order and higher order questions Helping pupils to improve their answers	Questioning skills	Eliciting skills	Questioning skills
Explaining Skills	Presentation skills			Clarity of explanation	Explanation Listening	Presentation and communication skills	Presenting skills	Teaching concepts
Communication Skills	Increasing student participation Response repertoire	Classroom interaction (4., 12.)	Competence in interpersonal transactions	Initiation and response Broad and narrow questions Reacting to pupil contributions	Attending to pupil behaviours Pupil reinforcement Pupil participation	(Developing pupil thinking)	Responding skills	Interpersonal communication skills
Classroom Management		Classroom management (6.)				Classroom management and discipline	Nurturing skills	Classroom management
Skills of Small Group and Individual Instruction		Individualized instruction (5., 11.,18.)				Skills of small group and individual instruction		
Observation Skills			Recognition and encouraging creativity		Perceiving teaching	Evaluative skills	Attending and appraising skills	Observation skills
Evaluation Skills			Evaluation in the classroom					Evaluation

I emphasize the word: hypothetical because it may well happen that in the course of a more thorough elaboration of the content of the individual groups of skills it will appear wise to make certain changes in or modify the categories we have established. It has already been found that our present system reflects the instructional side rather than the educational aspect of the instructional and educational activity. Despite this shortcoming, however, the available system in considered to be suitable for providing an adequate theoretical framework for both our research and experimental instructional activity.

6. The first group of skills is made up of the planning skills. The endeavours of today's pedagogy which are characterized by differentiation, individualization, the audio-visual and experimental aids gaining increasing ground and the teacher's growing freedom bring about an increase in the proportion of planning and organizational work in the pedagogical activity at the expense of the teaching activity proper. This trend is often identified as the teacher, the principal character of the teaching process gradually becoming the director of the instructional theatre and the related process. It is beyond any doubt that the planning tasks are very much on the increase. The teacher must be capable of determining what the most adequate content of instruction is for a given is for a given group (class) of students, setting and formulating clearly the measurable objectives and requirements, assessing the students' position (the standards of their knowledge and education) related to the goal. Besides, on the basis of the above he must be trained to face the task of planning the process of instruction (in other words: the logical structure of the teaching material, the students' activity, the necessary aids and means, the organizational framework and his own activity) and finally he must also plan the criteria and methods of evaluating achievement. When describing the content of the skill of planning I used the phrases "must be capable" and "trained to face". By doing so I wish to emphasize that it is not sufficient for a student teacher before graduation to possess knowledge of the given problematics but he must be able to cope with the given planning activity. Our task

is, therefore, to describe questions elaborated in didactics, the theory of education, psychology and educational technology like the content analysis, defining measurable objectives, measuring the level of knowledge and the level of education, selection of media, planning on a theme basis as a system of activities related to one another; besides, it is also our duty to elaborate the methods of acquiring and mastering them. In Hungary, Beata Kotschy is engaged with the detailed elaboration of the content of planning skills.

In the interactive stage six groups of skills have been distinguished. The first one is made up of the skills of conducting the teaching lesson. We are of the opinion that in this category the three skills most frequently mentioned in special literature, that is set induction, stimulus variation and closure are the most important ones. One of our colleagues has chosen the question of the content of the skill of conducting teaching lessons and the methods of the mastery of this skill to be treated in a dissertation.

The skill of asking questions is regarded as one of the essential skills. In our view in order that the method of asking questions be made effective the teacher must be capable of:

a) classifying the questions according to the different operations of thinking and putting questions bringing about these operations,

b) formulating the questions clearly and free from any ambiguity,

c) adopting a strategy of asking questions making it possible for the largest number of students to think actively on the highest possible level and participate with maximum activity,

d) putting further questions and complementary questions which ensure for the students that they find the best possible and most complete answers to them.

I think this sketchy presentation of the content of the skill of asking questions supplies evidence to the effect that we bore in mind the formation of components of a nature of analysis, decision making and implementation.

When developing the skill of explaining attention is paid to defining the goal clearly, to the rules governing the selection of the examples used for purposes of illustration, the sequence of the use of examples, the method of presentation, the logical construction of the explaining, the expedient application of audio-visual aids and means of demonstration, systematic repetition and to redundancy providing for the absence of ambiquity. It is endeavored tc eliminate factors that are likely to hamper the intelligibility of the explanation such as inconsistency in logics and formulation, indefinite and uncertain formulation, the use of "porkling" words, foreign and unknown words.

It is the skills of teacher-student interaction ans communication that make it possible for the teacher to guide and keep the system of relations established with the individual students or the class as a whole under control. Reaching mastery of the teacher's indirect behaviour enables the establishment of a free and democratic atmosphere providing for the students' independence. The skills of communication (such as the movement of the teacher's eyes, facial expression, gestures, movements with the body, silence etc. or more specifically, recognition of what they are intended to mean and their conscious application) make meta-communicative communication poossible. Appropriate reaction to the students' communications enables the regulation of the learning process.

We consider it justified to elaborate the skills of the classroom management independently even in case the transfer of the knowledge of the theory of education and social psychology making up the content of the skill needs no little and effort.

The situation is much more favourable with the group of skills used for directing group or individual work. This is attributable to the research and development activities carried on to this effect by Erzsebet Golnhofer and Maria Nádasi having made satisfactory progress. When describing the skills they discuss separately the elements of the teacher's activity which must be performed at the stages of preparing and leading individual work, during this work and at the concluding stage. (Golnhofer-Nádasi, 1979).

In addition to the six skills reviewed above and playing a role in the interactive stage the skills of observation, analysis and evaluation have also been included in our system. This is in line with the demand that the teacher must be capable of recording, elaborating and evaluating the signals relating to his work and its results. This is what enables the necessary modifications and the development of the knowledge of his own self. That is why we consider the mastery of certain techniques of observation and analysis to be very important.

In addition to organizing oral control and evaluation the skills of evaluation must ensure that the teacher is capable of elaborating tasks and questions designed to measure whether or not the different requirements have been achieved, evaluating and analysing the students' responses objectively, judging the standards of the students knowledge and on this basis making decisions as to the direction and further progress of instruction.

7. When discussing the individual skills I mentioned the sources on which we relied for support in determining the content. It can be said in general that there are four essential factors offering assistance in describing the pedagogical skills. First of all we take advantage of the conclusions of principle drawn by pedagogy, psychology, communication theory and sociology. Particular attention is devoted to correlational and experimental studies which, reveal relationships between the processes, the individual methods, the different components of pedagogical work and the development of the students' personality or their actual achievement. In this

field considerable results have been achieved over the past fifteen years or so. A critical analysis of the traditions and present international practice of teacher education can reveal new essential elements of content. I mention in the last place the method of disclosing the elements of the teaching activity with the assistance of the observational category systems. This constitutes one of the principal lines of our empirical research. At the moment the data collected in order to record the elements of the teaching activity designed to regulate learning is being evaluated. When discussing the skills of teacher-student interaction and of asking questions we emphasized the importance of the activity carried out by the teacher in response to the questions put or answers given by his/her students. This is the element of the teaching and educational work that is least possible to plan although it is perhaps the most essential one from the point of view of the success of the instructional/educational activities. As a rule, they take the form of brief comments on the part of the teacher which, because of the nature, must be improvised to a very large extent; they are designed to confirm the students' belief that the work they have performed is appropriate, to mobilize them for further activities, strengthen their self-confidence, pave the way for clarifying concepts and trains of thought and they can also single out the steps or stages of learning further. What should a teacher do in order that his acts achieve this impact? And what is usually done in this role of responding? A detailed analysis has been made of tape recordings made of the lessons conducted by different teachers, attended by students belonging to different age brackets in an effort to obtain an answer to the questions raised. The teacher's activity designed to regulate learning has been divided into four main groups. A total of eleven possible variations of direct reaction to the students' response have been distinguished but here we list only some of them: communicating with the student that the reply is wrong, asking for the answer to be repeated, giving the correct reply, utilizing the answer etc. Evidently, the different manners in which the teacher reacts are not of

the same value. Leading questions which make up the second group can also be of very different value depending on whether they bring about thinking on the part of the students thus inducing them to think collectively or they are simply of a nature of prompting.

Guiding instructions can be intended for the student giving replies or to the other students they may or may not references to the content. The teacher must possess skills of a character of analysis, decision making and implementation enabling him/her to select the appropriate guiding instruction and adopt it appropriately. Finally, there are all kinds of subsidiary questions belonging to the activities regulating the learning process.

8. At the beginning of this study I listed two questions to define the subject. What has been discussed so far is an account of the efforts made to disclose the characteristics of successful pedagogical activity, but no answer has as yet been given to the second questions which refers to the methods of teacher training making it possible to acquire the content outlined above.

What has been said so far in respect of the nature of the teaching profession and the content of the teacher's activity determine to a very large extent the demands to be satisfied by the methods adopted. A process is necessary which ensures:

a) the coordinated, integrated and simultaneous acquisition of pedagogical and psychological (occasionally social science) knowledge necessary for the pedagogical activity,

b) the actual integration of theoretical and practical training (meaning that theoretical information is made available for practical activity and that practice provides for the immediate and actual application of theory),

c) the different levels of application (meaning that a possibility is opened up not merely for an activity of the nature of analysis as in the case of the observation of a teaching

lesson; future teachers are faced not only with the problem of making decisions as, for instance, in the event of finding a solution to pedagogical problems or seeking a settlement of problematic situations, but it is also made possible for them to perform actual teaching or educational work, in short, activities of a character of implementation).

(In spite of the fact that within the frame of student teaching student teachers accomplish tasks belonging to the sphere of implementation traditional student teaching is not regarded as an adequate form because it fails to provide for the integration of theory and practice, the development of pedagogical skills and abilities because the time lag between the acquisition or theoretical knowledge and practical application is too long and the pedagogical situation is too complex to enable concentration on the development of the individual abilities and finally, the objective feedback which is indispensable for the process of developing abilities and skills of this nature is missing.)

Analysis of the different variations of microteaching can offer a favourable basis for the elaboration of training meeting the requirements we set.[10]

Therefore, there was no need to elaborate any kind of new methodology. Research has had to and will have to be carried on in two directions: on the one hand, international practice must be adapted to Hungarian conditions, that is to say, it must be established which of the microteaching methodologies that have been developed can be used to achieve our objectives of training, can be adapted to the system and traditions of teacher education in Hungary and to the prevailing material and technological conditions and what sort of modifications are necessary to be made for the adaptation.

On the other hand, it is also necessary to elaborate the teaching aids both of which involve research of the development type. The related skills must be described, models must

be recorded, evaluation slips must be made along with handbooks guiding the student teachers' activities. These two lines of research presuppose one another. Adaptation needs aids while it is essential to know the methods to be adopted and the organizational framework for producing these aids. Being aware of the completely interrelated tasks involved we began the research programme designed to polish and refine the methods with the assistance of descriptions of skills and evaluation sheets compiled provisionally and we began to produce aids for a hypothetical methodology.[11.]

The examinations launched three years ago at the Teachers' Training School of Esztergom have supplied an answer to the question whether or not a variation of microteaching needing only a modest framework in which the student teachers must acquire the skill only from oral description while sound recording provides for feedback and the supervisor is not always present at the analysis sessions can be used successfully in teacher education. Student teaching before and after microteaching sessions were taped during four semesters and control groups were also used for the experiment. Each microteaching period was also taped. The written replies submitted by the student teachers, pupils and teachers in charge offer supplmentary information.[12.]

Parallel with this type of measuring of results, examples were collected for the description of skills and the raw material was worked out for the models of explaining, asking questions and evaluating. The scheme of experimental and optional microteaching introduced at the Faculty of Arts of Eötvös University, Budapest was carried on in the two semesters of the academic year of 1978-79. Because the time made available was limited only one microteaching cycle (studying the description of skill-planning-teaching-analysis-re-teaching-analysis) can be accomplished. Our, third year

students have a very positive opinion about the teaching opportunity and feedback provided by video-recording. The experiences we gained supply ample evidence to show that even this one cycle is sufficient to call the student teachers' attention to faults they have not been aware of before and enables them to embark on eliminating them. Lectures on didactics have unanimously concluded that student teachers participating in the scheme of microteaching take increased interest in theoretical questions and they are capable of discovering the relationship between what they have been taught and what they have seen in practice.

9. In conclusion I would like to summarize the major achievements of our research along with the principal tasks that lie ahead of us.

I list in the category of results the following:

1) A theoretical framework for research has been made available into which the individual activities can be fitted,

2) we have a methodology at our disposal suitable for carrying on research on the teacher's activity,

3) we have been successful in outlining the major groups of pedagogical skills,

4) we possess certain knowledge as to the content of the indicidual pedagogical skills,

5) we know the principal characteristics of a process of teacher education by which pedagogical skills and abilities can be developed,

6) a programme for the development of materials, aids and means necessary for the practical application of the process has been launched.

The major tasks lying ahead of us are as follows:

1. By relying on needs assessment and on the observation of practical activities the established system of pedagogical skills must be modified, expanded or verified,

2. the observation of teaching lessons should be used increasingly to disclose the elements of content of the skills in more detail and in a more differentiated manner, the impact of the individual components of the skills on the development of the personality and student achievement must be verified by correlational and experimental examinations,

3. the aids and subsidiary materials enabling the acquisition and mastery of skills must be developed and their effectiveness must be verified,

4. the content of skills and abilities must be coordinated with the present programme of teacher training, or the activities designed to develop the skills and abilities must be fitted into the prevailing system of training.

REFERENCES

1. Abdullina, O.A.: The problem of pedagogical skills in the theory and practice of teacher training (Russian) Sovietskaya Pedagogika, 1976. 176-84.

Slastienin, V.A.: Development of personality of soviet school teachers in the prosess of professional training (Russian) Prosvescsenije, Moskva, 1976.

Gage, N.L.: Teacher Effectiveness and Teacher Education Pacific Books, Palo Alto, California, 1972.

Gage, N.L.: The Scientific Basis of the Art of Teaching Teachers College Press, New York - London, 1978.

Berliner, D.C.: Microteaching and the Technical Skills Approach to Teacher Education. Stanford University, California, 1969.

Borg, W.R.: The Minicourse as a Vehicle for Changing Teacher Behavior Journal of Educational Psychology, 1972. 572-579.

Rosenshine, B.: Teaching Behaviors and Student Achievement NFER, London, 1971.

2. Flanders, N.A.: Analysing Teaching Behavior Addison-Wesley, Reading Mass. 1970.

Wragg, E.C.: Teaching Teaching. David and Charles, London, 1974.

Koskenniemi, M. - Komulainen, E.: Investigations into the Instructional Process, X. Research Bulletin No: 39. Institute of Education, University of Helsinki, 1974.

Falus, I. - Gonhofer, E.: A category system observing university lectures (Hungarian) Magyar Pedagogia, 1973. 1-2.

3. Makarenko, A.S.: Works, Volume 5. (Russian) APN RSFSR, Moskva, 1951.

4. Popham, W.J.: Performance Tests of Teaching Proficiency American Educational Research Journal, 1971. 8. 105-117.

Borg, W.R.: Alternative Strategies of the Introduction of Educational Technology into the Training and In-Service Training of Educationalists in International Seminar on Educational Technology, Final Document, Budapest, 1977.

Tserkes-Zade, N.M.: Laboratory and practical exercises on education (Russian) Sovietskaya Pedagogika, 1977. 3. 76-83.

Turbovskoy, Ja. S.: Development of professional creative thinking of student teachers (Russian) Sovietskaya Pedagogika, 1977. 2. 79-88.

General pedagogical training of future teachers (Russian) Ed. by A.I. Piskunov MGPI Lenina, Moskva, 1972.

5. Combs, A.W. - Blume, R.A. - Newman, R.A. - Wass, H.L.: The Professional Education of Teachers. Allyn and Bacon Inc. Boston, 1974.

6. Shavelson, R.J.: Teachers' Decision Making in The Psychology of Teaching Methods. University of Chicago, 1976. 372-414.

7. Kiselgof, S.I.: Developing pedagogical skills of students during university training (Russian) LGU, Leningrad, 1973.

Turbovskoy, Ja. S. op. cit.

Kuzmina, N.V.: Methods of research on pedagogical activity (Russian) LGU, Leningrad, 1971.

Spirin, L.F. - Frumkin, M.L.: An examination of professional-pedagogical preparedness of students to school work (Russian) Sovietskaya Pedagogika, 1975. 11. 71-79.

8. Teaching Skills for secondary School Teachers. General Learning, 1969.

Borg, W.R. et al.: The Minicourse. A Microteaching Approach to Teacher Education Macmillan, 1970.

Brown, G.: Microteaching. A Programme of Teaching Skills. Methuen and Co. Ltd, London, 1975.

Weigand, J.E.(Ed.): Developing Teachers Competency Prentice-Hall Inc. Englewood Cliffs, New Jersey, 1971.

Cooper, J.M (Ed.): Classroom Teaching Skills D.C. Heath and Company, Lexington, Mass. 1977.

Turner, R.L. (Ed.): A General Catalog of Teaching Skills, Indiana University, 1973.

Turney, C. et al.: Microteaching: Research, Theory and Practice University Press, Sydney, 1973.

9. Golnhofer, E. - M. Nádasi, M.: The basic problems of differentiation in the pedagogical process (Hungarian) Pedagógiai Szemle, 1979. 3.

10. Falus, I.: Teacher effectiveness and teacher training (Hungarian) Pedagógiai Szemle, 1972. 12.

Falus, I.: Microteaching (Hungarian) OOK, Budapest, 1975.

Falus, I.: The Use of Microteaching and Allied Techniques for the Training of Educational Personnel in Sweden, the Federal Republic of Germany and United Kingdom UNESCO, Paris, 1975.

Falus, I.: Developing packages for microteaching (Hungarian) OOK, Budapest, 1975.

11. Falus, I.: Explaining, Questioning, Reacting. Training Manuals (Hungarian). Eötvös Loránd University, Budapest, 1976.

12. Falus, I.: Microteaching in practice (Hungarian) Pedagógusképzés, 1978. 3.

The Methods of Teacher Training in Hungary

by

Ivan Falus

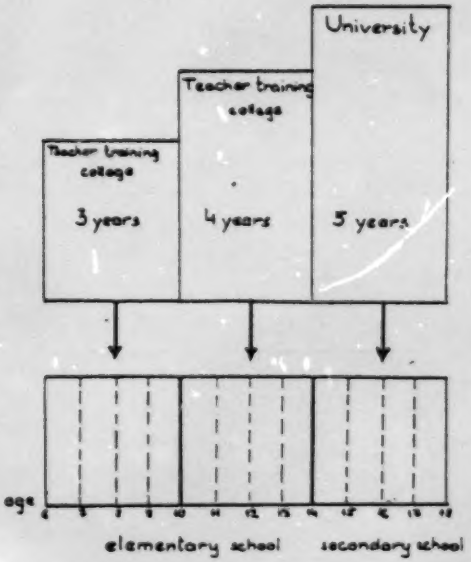
I would like to describe very briefly the Hungarian teacher training system and the methods used. I know that you are not so interested in the details of our problems and results but I hope that showing our situation as a case study will have some value for you. It will exemplify how a school system and a teacher training system with a strong Prussian tradition can integrate the new developments coming from Anglo-Saxon countries, and how we can use the new methods and techniques widely spread in Western-Europe and the United States in the frame of of our different ideology and educational theory. I believe that I can also demonstrate some positive characteristics of our teacher training system which originates in our traditions, in our ideological basis and the new developments of the last decade.

We can interpret the methods appropriately only if we have some information about the system in which the methods are applied.

In Hungary teachers are trained mainly in three types of institutions. (I do not speak about the training of kindergarten teachers). All of the three institutions enroll students who have completed their secondary school studies so all types of teacher training are of higher level.

For teachers of 6-9-year-old children the training period is 3 years at teachers' colleges. Other teacher training colleges provide 4-year training courses for teachers of 9-13-year-old children. Finally, the universities train the teachers of 14-17-year-old pupils. Recently, experiments have been started to unify institutions of the three types mentioned above and to establish colleges with so called "two-step" training profile (for example to train teachers for 3-10; 6-14; 10-18-year-old pupils). Nevertheless, now the system shown in Figure 1 is in existence.

Figure 1. Teacher training institutions



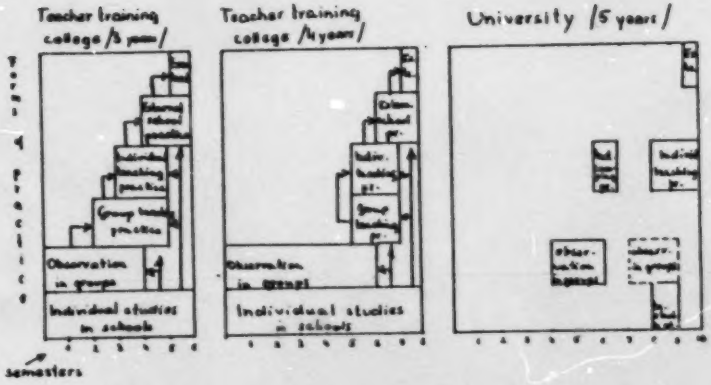
At the different institutions quite different training models are applied. We can see this if we compare the number of hours devoted to the theoretical pedagogical courses.

Figure 2. Theoretical courses in education and psychology

	University											Teacher training colleges																	
												/4/									/3/								
	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8		1	2	3	4	5	6		
Psychology																												
General Psychology		1									28	3		1						45	3						45
Developmental "			1								28		3							45		3					45
Educational									1		14			1						30			1				30
Education																												
History of Education							1				28								1	30					1		30
Theory of Education						1					28				1	3				60		2	2				60
Didactics					1						28				3	4				60	3	4					60
Methods of subject teaching								3	4		114					1	2	2		90				3			45
Special courses /educational technol. cultural politics pioneerwork rhetorics etc./			1								28		1	1	2		1		1	225	4	2			5	4	22
											294									525							540

There is not any theoretical consideration that could justify the enormous difference between teacher training colleges and universities. The contradiction becomes still more obvious if we analyse the various forms of practical training.

Figure 3. Forms of practice



Individual studies mean that the students visit schools individually, take part in organizing excursions, celebrations, meeting parents, home visits, etc. They observe individual pupils and analyse their psychical activity, fulfil sociometrical tests and so on.

Group observation means that a group of 12-16 students visits a classroom and watches a lesson on closed circuit television in order to observe and analyse the whole pedagogical process.

Group teaching practice means that a group of 10-12 students visits the same class each week during a semester. One or two of the students teach a lesson every week with the others participating in it. Afterwards the whole group together with a supervisor analyse the actual performance.

Individual teaching practice goes on at the basic schools of the teacher training institutions. The students of pedagogical colleges teach 16-18 hours, those of the universities 32 hours.

External school practice takes place at average schools, and lasts 4 weeks. The students participate in the whole work of the school and teach at least 30 hours.

At teacher training colleges the various forms of practical activity accompany the students from the very beginning to the end of their studies, but at universities this chain is broken off. As you can see, at the first two institutions the theoretical pedagogical subjects go parallelly, coordinately with practice, but at universities the first practice, the observation starts only in the 5th and the 6th semesters when the students study didactics or theory of education. The students have summer practice in pioneer camps following this third year and their first real teaching takes place only in the fifth year.
Of course, the previous figures demonstrate only the organizational frames in which the theoretical and practical training could be quite different. Probably the same criticism has been formulated concerning the Hungarian teacher training system in the last years, as in other countries all over the world, namely:

- the teacher training institutions do not prepare their students for practical work;
- the beginning teachers do not possess the competence and skills needed in their everyday practice.

Searching the reasons of the inappropriate preparation the specialists stated, that:

- the theoretical educational subjects deal with not real, school relevant practical problems;
- every single educational and psychological science (and subject) approaches the same phenomenon from different viewpoints, and the various aspects are not synthetized;
- the classroom observations and school practices are not connected with the theoretical basis, they are not purposeful enough.
- the real teaching occurs too late and its duration is insufficient.

Only such a teacher training system can abolish the mentioned inadequacies that really integrates the theoretical and practical part of the training.
Integrated training means that the theory is practice-oriented from the very beginning and the practice is based on the theory that is taught to the students.

Integrated training presumes that
- the content of theoretical courses should derive the examples from educational practice;
- the content of professional subjects should be chosen and built up with regard to the school subject
- the students should have contact with children from the very beginning of their studies
- practice should provide problem-solving tasks for the students, (the students shold know which knowledge to apply in the given situation)
- practice should give more and more possibilities for the self-contained activity step by step

These principles constitute the basis for the new developments which have appeared in Hungary in the last years. Some of these developments have their impact on the existing curricula, some others not yet.

1. <u>The integration of theoretical subjects</u>

The theory can be practice-oriented only if the individual subjects do not follow their own scientific systems, but give a unified knowledge necessary to solve practical problems. As a first step there was introduced a so-called synthetizing course in order to find the connections between previously learned subjects. Later some departments started to teach combined courses, for example didactics and theory of education or educational psychology and theory of education in one course. There are some attempts to find out the mutual dependence of units of psychological, philosophical and pedagogical knowledges. These interrelations give the content basis for integration.

2. The illustration of lectures by videorecordings

Videorecorders have been widely used in Hungary since the mid-seventies. Earlier the lectures could based only on the previous school observations of the students or the verbal descriptions of the lecturers. Videorecording provides possibilities to illustrate theoretical knowledge by videotapes recorded and edited especially for the given purpose. Different types of videorecordings have been developed.
Shortened lessons try to detect the structure of the whole lesson, only the irrelevant details are distracted from the original recording.
Thematical archives contain short selections from previously-made recordings, that are suitable to illustrate a given educational principle, concept or method.
Longitudinal recordings are made in different times (at the beginning of the school year, two months, five months later) and show the pupils'development in process as the effect of a special method or a new curriculum. We have made such recordings on the various methods for elementary reading, and on the new maths.
Finally, the so-called problematic situations seam for us very valuable to provoke the students' thinking.

3. Now we have arrived at the third characteristic of our efforts, namely trying to present the students tasks, problem-solving situations in each phase of their training. The first task comprises an analysis of school life, the evaluation of one or more aspects of the pedagogical process. Later the students should solve problematic situations in theory, finally they are to face problems in real practice.

4. To make the classroom observations more exact - is our fourth effort. Classroom observations also play a very important role in the traditional teacher training system. They are planned to provide empirical experiences for students, to give an outlook on the components of their future work. But these requirements have not been wholly satisfied. While the students

were present in the classroom without having accurately formulated observation lists, these observations could not result in proper knowledge. The training institutions try to develop systematic observation instruments, in order to guide the students' observations precisely. But the category systems and sign systems widely used for research purposes do not work in the training. They seem to be too detailed, because of their behaviouristic character they do not help the necessary generalizations, do not load to the causes of the phenomena.
Our main task is to develop instruments with a well-established theoretical base, that include high inference categories and at the same time control the students' cognitive processes accurately.

5. The development of teachers' behaviour and the communication skill-training was a quite neglected area in Hungary. The practical courses of this type have started very recently in connection with the occurence of videotechniques. The purpose of these courses is to make aware of their own indirect, metacommunicative behaviour, the congruence or incongruence of the channels of communication. The teacher training colleges' in Budapest and Pécs have initiated courses on the improvement of social skills and communicative ability. It is stated in the programme that the course differs from microteaching courses and from skill training techniques, "in which other detailed description and improvement of the skills are separated from their determinant. We approach the components of teachers' behaviour as an integral part of the whole educational situation."
Social skill improvement practices are not aimed at acquiring previously determined skills, but the students perform some pedagogical activity (give lectures, lead discussions, introduce themselves) and later they analyse the recorded behaviour in order to improve their self-image and their communication ability.

6. Microteaching

We would like to build a bridge between the theoretical and practical training of the students by microteaching courses. During microteaching we want to reach preliminary precisely determined objectives, skills like explanation, questioning, evaluation etc. In this respect microteaching differs from social skill training. Naturally, there are a lot of ways to recognize the basic communication techniques though it is not the main purpose. We have tried to change the behaviouristic character of original microteaching programs worked out in the United States. We do not count the number of occurrences of different skills but do evaluate the quality of performed skill and analyse its adequacy. The students should give motives of their solutions. So we form analytical and decision-making skills in addition to the performance ones. Microteaching is used at the University of Budapest, and at the teacher training colleges of Esztergom, Szombathely and Eger.

7. Teaching practice in schools

The greduating students teach approximately 30-40 lessons at the basic school of the institution. This teaching practice has a very important integrating role. But this practice can be effective if it creates an organic system with the training process provided by the institutions, it it gives ground for applying the theoretical knowledge the students have acquired. The teachers of the basic schools should be aware of the same knowledges. Therefore the departments of psychology and education systematically provide refreshing courses for the teachers and involve them in research activity.

The teachers of basic schools should be acquainted with the exact list of competence and skills to be obtained by the students. The students take part in every aspect of school activity, not only in classroom teaching.

We face the problem that the students have to teach at school and write their diploma thesis at the same time. It is much better to, concentrate school practice for a short period and release the students from other duties.
The beginning teachers frequently complain about the work at the basic schools being quite different from the work they had to do at other ordinary schools and therefore they have a lot of troubles in their first years. It seems to be very useful to divide teaching practice into two parts. The first one serves the strengthening of theoretical knowledge, the thorough development of teaching skills (this part takes place at basic schools), the second part is a more independent, more general education practice at an ordinary, so-called "external" school.

I think that this brief description has showed our main difficulties and our intention to solve them. As you could see, we inherited a teacher training system from the past containing rigorously separated institutions for the various age levels; the educational subjects traditionally have been taught apart from one other; the lectures have been based strongly on philosophy, ideology, educational theory, but they have not been practice-oriented; indeed, the improvement of teachers behavior has been a neglected area in the preparation; neither classroom observations nor practice at schools have been accurately directed by theory.

In the last years we have tried to adopt the methods, techiques and ideas born in other training systems in different ideological circumstances. We hope that we can implement the new techiques and methods without losing our intentions and the values of our traditions.

It is encouraging for further development, that the research of teachers' behaviour and teacher training is one of the 5 main pedagogical research projects between 1981-85. It will be prominently sponsored by the government as its purpose is to prepare decisions on educational politics.

LITERATURE

1. Falus, Iván: Mikrotanitás (Microteaching) OOK, Bp. 1975.

2. Falus, Iván: Videofelvételek a pedagógusképzésben (The types of videorecordings used in teacher training) Audiovizuális közlemények, 1977. 2.

3. Falus, Iván: Mikrotanitás a gyakorlatban (Microteaching in practice) Pedagógusképzés, 1978. 5.

4. Ladányi, Andor: A tanárképzés továbbfejlesztése: problémák, feladatok (The further development of teacher training: problems, tasks) Felsőoktatási Szemle, 1980. 7-8.

5. Markó, Endre: A gyakorlati képzés házi utmutatója (Guidelines to practical training) Győr, 1979.

6. Orosz, Sándor: A tömbösítés és az integrált oktatás a pedagógusképzésben (The integrated and block instruction in teacher training) Felsőoktatási Szemle, 1980. 7-8.

7. Óvári, Ágnes: A tanárképzés óratervi problémái (The lesson-plan problems of teacher training) Magyar Pedagógia, 1980. 2.

8. Papp, József: Az iskolai gyakorlatok helye és szerepe a tanító és az általános iskolai tanárképzésben (The place and role of school practices in training of elementary and secondary school teachers) Felsőoktatási Szemle, 1979. 3.

9. Poór, Ferenc (ed.): A képmagnetofon alkalmazása a pedagógusképzésben es továbbképzésben (The use of the videorecorder in the preservice and in-service teacher training) OOK, Veszprém, 1980.

10. Fabián, Zoltán: Az elméleti és a gyakorlati képzés koordinálása az iskolai gyakorlatban (Coordination of theory and practice in school practices) Pedagógusképzés, 1976. 1.

Die Beziehungen zwischen theoretischer und praktischer Ausbildung in der Lehrerbildung. Feindisposition zum Diskussionsbeitrag

von

Albrecht Herrmann

Seit dem VIII. Pädagogischen Kongreß und der V. Hochschulkonferenz beschäftigen sich Erziehungswissenschaftler und Lehrer verstärkt mit der Frage, wie die gewachsenen Anforderungen der Gesellschaft an die kommunistische Erziehung der Schuljugend der DDR immer besser gemeistert werden können. Das erfordert u.a. auch die künftigen Lehrer immer besser auf ihren Beruf vorzubereiten.

Unsere Studenten benötigen die marxistisch-leninistische Pädagogik, einschließlich Methodik und pädagogischen Psychologie, als angewandte Wissenschaften, die ihnen theoretisch begründete und gesicherte, aber gleichzeitig praktikable Handlungsorientierungen für die verschiedenen Bereiche ihrer Tätigkeit zur Verfügung stellen.

Voraussetzungen für die Erfüllung der verschiedenen Erziehungs- und Bildungsinhalte ist die Bestimmung jener Wissenschaftsinhalte, die sich der Student zu Beginn seiner Lehrertätigkeit unbedingt angeeignet haben muß. Dabei ist zu beachten, daß Wissenschafts- und Ausbildungsdisziplin nicht identisch sind. (Wissenschaftsdisziplin besitzt Primat, unterscheidet sich durch Zielstellung und Umfang von Ausbildungsdisziplin. Orientierung auf wesentliche pädagogische, methodische und psychologische theoretische Erkenntnisse).

Gegenwärtig beschäftigen wir uns mit der Frage, welche Theorie der Lehrer als Grundlage für Handlungsorientierungen im pädagogischen Prozeß benötigt.

Das in den Teildisziplinen der Pädagogik und Psychologie theoretisch vermittelte Wissen wird erst dann zu einer Handlungsorientierung für die Bewältigung des pädagogischen Prozesses, wenn es im Bewußtsein der Studenten als ganzheitliche, praktisch-handhabbare Theorie widergespiegelt wird. Damit wird verhindert, daß der Student mit praktizistischen Vorstellungen in die Erziehungspraxis geht und sich dabei nicht von theoretischen Erkenntnissen leiten läßt.

Die Theorievermittlung muß stets die pädagogische Könnensentwicklung der Studenten zum Ziel haben. Nicht umsonst machte Lenin den Wert einer Hochschulausbildung von der Könnensentwicklung abhängig, wenn er feststellte: "Keine Schule und keine Universität ist etwas wert, wenn das Können fehlt." (W. I. Lenin, Bd. 31, Bln. 1959, S. 453.)

Das pädagogische Können der Studenten muß während des ganzen Studiums durch theoriegeleitete praktische pädagogische Tätigkeiten zielgerichtet und systematisch entwickelt werden.

Über pädagogische Aufgabenstellungen, die das Zusammenwirken von Kenntnissen aus verschiedenen Lehrgebieten erfordern, sind Übungen zur Entwicklung des pädagogischen Könnens in der Praxis durchzuführen.

Die Übungen müssen solche Tätigkeiten beinhalten, die auf wesentliche Fragen der Bildung und Erziehung der Schüler gerichtet sind und Tätigkeiten vor allem im unterrichtlichen und außerunterrichtlichen Bereich sowie im Bereich der Klassenleiter- und Fachlehrertätigkeit betreffen.

Die Konzentration auf wesentliche Schwerpunkte ist notwendig, weil sich pädagogisches Können nur stufenweise und über Tätigkeiten in den verschiedenen Bereichen der pädagogischen Praxis zur Ganzheitlichkeit entwickelt.

Schwerpunkte zur Führung der pädagogischen Könnensentwicklung sind u.a.

- die Befähigung zur Planung, Gestaltung und Einschätzung von Erziehungs- und Bildungsprozessen
- die Befähigung zur Gestaltung erzieherisch wirksamer Lehrer-Schüler -Beziehungen
- die Befähigung zur Koordinierung der Anforderungen und Bedingungen von Bildung und Erziehung bezogen auf die Tätigkeit des Klassenleiters und Fachlehrers
- die Befähigung zur Analyse und Bewertung pädagogischer Situationen und zur Ableitung pädagogischer Maßnahmen
- die Entwicklung von Varianten pädagogischen Vorgehens

Maßstäbe für die Qualität des sich entwickelnden pädagogischen Könnens sind z. B.

- das Niveau der Selbständigkeit bei der Bewältigung der Anforderungen (bestimmt durch den Umfang der Anleitung und der selbständigen Tätigkeitsausübung und durch den Anteil reproduktiver und schöpferischer Tätigkeit)
- das Niveau der Befähigung zum zielorientierten und planmäßigen Vorgehen
- das Niveau der Befähigung zur Integration von Kenntnissen, Fähigkeiten, Fertigkeiten und Erfahrungen bei der Lösung pädagogischer Aufgaben
- das Niveau der Disponibilität bei der Bewältigung der Anforderungen
- das Niveau der Schnelligkeit und Richtigkeit des Handelns in pädagogischen Situationen usw. und schließlich das Niveau zieladäquater pädagogischer "Techniken"

Die Praxisbeziehungen der Studenten sind gekennzeichnet durch angeleitete Vorbereitungen, Hospitationsaufträge und angeleitete Übungen und Auswertungen, wobei die Studenten über das in den Lehrveranstaltungen erworbene Wissen hinaus befähigt werden, die pädagogische und psychologische Literatur weitgehend

selbständig für die Bewältigung der Anforderungen zu nutzen.

In allen Lehrveranstaltungen muß gesichert sein, da die praktischen Erfahrungen der Studenten theoretisch aufbereitet werden, um die Sicht auf den komplexen pädagogischen Proze jederzeit zu gewährleisten. Damit soll dem Studenten besser als bisher die Schulbezogenheit der Lehrerausbildung verdeutlicht und bei ihm eine bessere Motivierung für hohe Studienleistungen in allen Fächern gesichert werden.

Für die Beziehungen zwischen theoretischer und praktischer Ausbildung gilt die marxistisch-leninistische Grundposition: "Von der lebendigen Anschauung zum abstrakten Denken und von diesem zurück zur Praxis das ist der Weg der Erkenntnis zur Wahrheit, der Erkenntnis der objektiven Realität".

An einem Beispiel wird ein Auftrag für die schulpraktische Tätigkeit der Studenten dargestellt. (Beispiel für die Gestaltung eines Abschnitts eines schulpraktischen Tages. Auszug aus der angeleiteten Vorbereitung, dem Hospitationsauftrag und den Aufgabenstellungen für die Übung).

1. Thema
   Die Gliederung des Unterrichtsprozesses nach didaktischen Funktionen (II. Stdj., Thema 1)
   Vorbemerkungen:
   Die zweite Vorlesung zur Didaktik vermittelte den Studenten E[illegible]sichten über die didaktische Struktur der Unterrichtsstunde. Sie lernten im Überblick die verschiedenen didaktischen Funktionen kennen und eigneten sich Kenntnisse über deren wechselseitige Abhängigkeit und gegenseitige Durchdringung an. Die didaktischen Funktionen "Einführung" und "Arbeit am neuen Stoff" wurden ausführlich behandelt. Der in der Vorlesung vermittelte Stoff, ergänzt durch vorbereitendes Literaturstudium, bildet die wissensgemäßige Grund-

lage für die Hospitationstätigkeit.

2. Zielstellung
   Die Studenten vertiefen und festigen ihr Wissen über didaktische Funktionen und erkennen im Ergebnis der Auswertung der Hospitationstätigkeit, daß die Effektivität des Unterrichts maßgeblich von seiner zweckmäßigen, den didaktischen Bedingungen gerechten Struktur, den entwicklungspsychologischen Besonderheiten der Schüler und der Beachtung lernpsychologischer Gesetzmäßigkeiten bestimmt wird. Die Studenten werden befähigt, didaktische Erscheinungen des komplexen Bildungs- und Erziehungsprozesses durch Beobachtungen zu erfassen und schriftlich zu fixieren, theoretische Erkenntnisse über die Gliederung des Unterrichts bei der Analyse praktischer Sachverhalte anzuwenden und begründete Schlußfolgerungen für ihre spätere Unterrichtstätigkeit zu ziehen.

3. Schwerpunkte
   Abfolge der didaktischen Funktionen in Abhängigkeit von den angestrebten Unterrichtszielen und vom Inhalt des Stoffes.
   Problem der Überlagerung verschiedener didaktischer Funktionen.
   Stundentyp und didaktische Funktionen.

4. Aufgabenstellung für die Studenten
   a) Hospitationsaufgabe
   Erfassen Sie die stoffliche und didaktische Gliederung der Unterrichtsstunde und kennzeichnen Sie - gegebenenfalls nachträglich - die jeweils vorwiegende didaktische Funktion!
   Tragen Sie in die Spalte "Bemerkungen" ergänzende Hinweise zur Beobachtungsaufgabe und zu besonders auffallenden Erscheinungen ein!
   Protokollthema: Zeit, did. Funktion, stoffl. Ablauf, Bemerkungen.

b) Auswertungsaufgabe
Welche didaktische Funktion war dominierend?
Welche lernpsychologischen Gesetzmäßigkeiten sind dabei berücksichtigt worden?
An welchen Stellen kam es zur Überlagerung verschiedener didaktischer Funktionen?
Wie schätzen Sie die Struktur der Stunde unter dem Gesichtspunkt der erreichten Ergebnisse ein?
In welcher Weise wurde die Berücksichtigung entwicklungspsychologischer Besonderheiten sichtbar?
Welche weiteren Möglichkeiten des Stundenaufbaus sehen Sie?

5. Literaturstudium zur Vorbereitung auf die Hospitationen
Mitschriften zur 2. Vorlesung.
Klingberg, L.: Einführung in die Allgemeine Didaktik. VWVV, Berlin 1974, S. 235 - 238.

Die Ausbildung von Diplomlehrern für naturwissenschaftlicher Fächer der allgem. bildenden polytechnischen Oberschule der DDR an Universitäten und Hochschulen - dargestellt am Beispiel des Chemielehrerstudiums

von

Hans Keune

In der Deutschen Demokratischen Republik besteht für alle Kinder eine 10-jährige Schulpflicht, die in der zehnklassigen allgemeinbildenden polytechnischen Oberschule realisiert wird. Die naturwissenschaftlichen Fächer werden hier als Fachunterricht erteilt, Biologie von der 5. Klasse, Physik von der 6. Klasse und Chemie (die uns hier besonders interessieren soll) von der 7. Klasse ab. Bis zum Abschluss dieser Schule haben die Schüler einen vierjährigen in sich geschlossenen, systematischen und pädagogisch-methodisch orientierten Lehrgang im Chemieunterricht zu absolvieren, der - unterstützt durch Vorleistungen und gegenseitige Durchdringung mit dem Physik- und Biologieunterricht - ein beachtenswertes Niveau der Bildung ermöglicht.

In der Abiturstufe dieser Schule, die an diesen Unterricht harmonisch anschliesst, werden diejenigen Schüler, die ein Hochschulstudium aufnehmen oder einen anderen entsprechenden Beruf ergreifen möchten, zur Reifeprüfung (Abitur) geführt. Für zwei weitere Jahre (= 11. und 12. Klasse) wird der zunächst abgeschlossene Unterrichtsstoff wieder aufgegriffen und auf höherem Niveau fortgeführt.

Für die Erteilung dieses Fachunterrichts - in unserem Falle des insgesamt sechs Jahre umfassenden Lehrgangs der Chemie - werden in einem vierjährigen Hochschulstudium

Lehrer ausgebildet, die mit ihrem Hochschulabschluss den akademischen Grad "Diplomlehrer" erwerben.

Die Konzeption für die Diplomlehrerausbildung entspricht zwei Grundprinzipien:

1. Die Ausbildung als Diplomlehrer ist ein "vollakademisches" Studium, das ausschliesslich an Universitäten und Hochschulen erfolgt.

Mit der Realisierung dieses Prinzips wird einer Forderung entsprochen, welche die fortschrittlichsten Lehrer unseres Landes seit über 100 Jahren immer wieder erhoben haben. Da in der DDR die Universitäten den Hochschulen rangmässig völlig gleichgestellt sind, ist auch der Ausbildungsgang an allen diesen Institutionen gleich:

Es wird nach gleichem Studienplan und nach gleichen Lehrprogrammen ein Lehrer ausgebildet, der die Lehrbefähigung für die Erteilung des Fachunterrichts in zwei Fächern der Klassen 5 bis 12 erhält.

Voraussetzung für die Aufnahme des Lehrerstudiums ist die erworbene Hochschulreife (d.h. die Ablegung des Abiturs). Bedingt durch das Niveau der Ausbildung und die Struktur der Ausbildungseinrichtung hat sich die Realisierung des Lehrerstudiums vollständig den an den Universitäten und Hochschulen bestehenden Normen angepasst:

- Das Studium erfolgt in festgelegten Studentengruppen (Seminargruppen) von etwa 20 bis 30 Studenten, die für die Dauer des gesamten Studiums zusammenbleiben. Eine bewährte Lehrkraft wird jeder Seminargruppe als "Seminargruppenberater" zugeteilt, die für die Dauer des Studiums die Studenten in allen Fragen berät, die das Studium ebenso betreffen wie persönliche Sorgen und Nöte. Hauptaufgabe des Seminargruppenberaters ist die Erziehung der Studenten, d. h. die Entwicklung der Persönlichkeit des künftigen Lehrers.

- Das Studium erfolgt hochschulgemäss,
  durch Teilnahme an Vorlesungen, Übungen, Seminaren, Praktika und Exkursionen,
  Durch Formen der selbständigen wissenschaftlichen Arbeit (z.B. in Bibliotheken, Laboratorien und auf Exkursionen),
  durch aktive Beteiligung am kulturellen studentischen Leben in Klubs, Chören und Gruppen,
  durch Ablegung der erforderlichen Prüfungen, Testate und Belege,
  durch Teilnahme an der wahlweise-obligatorischen Ausbildung zur Anfertigung einer wissenschaftlichen Anforderungen entsprechenden Diplomarbeit und deren Verteidigung.

Nach Abschluss des Lehrerstudiums (verbunden mit dem Erwerb des akademischen Grades "Diplomlehrer) ist die Voraussetzung gegeben, eine folgende Qualifizierung in Angriff zu nehmen mit dem Ziel, den akademischen Grad des Doktors eines Wissenschaftszweiges - den Dr. paed. (doctor paedagogiae), Dr. rer. nat. (doctor rerum naturalium) oder Dr. phil. (doctor philosphiae) zu erwerben.

Inhalt und Organisation des Lehrerstudiums entsprechen darüber hinaus auch den allgemeinen Grundsätzen der akademischen Ausbildung:

2. Die Ausbildung der Diplomlehrer erfolgt nach festgelegten aufeinander abgestimmten Ausbildungsbestandteilen, die eine den Forderungen unserer Gesellschaft entsprechende Lehrerpersönlichkeit entwickeln lassen.

2.1. Die Diplomlehrer werden in zwei Fächern ausgebildet, wobei ein Fach als Hauptfach und das andere als Nebenfach konzipiert ist. Die Kombinationen der zwei Fächer sind durch den Studienplan vorgegeben. So kann z. B. das Fach Chemie in den nachfolgend genannten Kombinationen studiert

werden:

Chemie / Biologie
Chemie / Mathematik
Biologie / Chemie
Mathematik / Chemie,

wobei das jeweils zuerst genannte Fach das Hauptfach darstellt.

2.2. Die Gesamtdauer des Lehrerstudiums beträgt vier Jahre. Eine zusammengefasste Übersicht über die zeitliche Abfolge des Diplomlehrerstudiums vermittelt der Rahmenablaufplan, der in der Abbildung 1 dargestellt ist.

Abbildung 1 Rahmenablaufplan

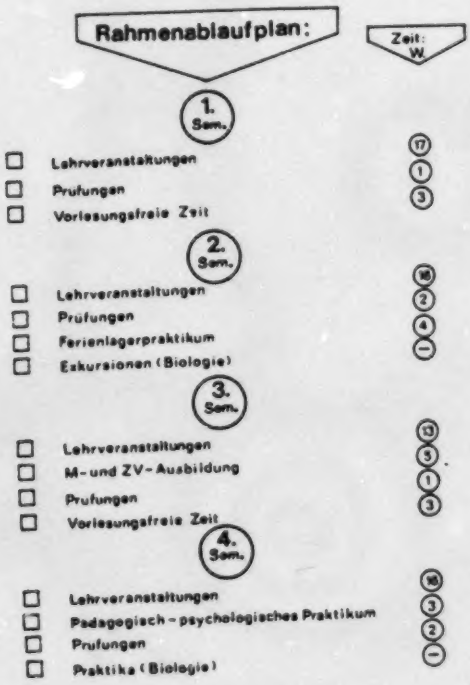
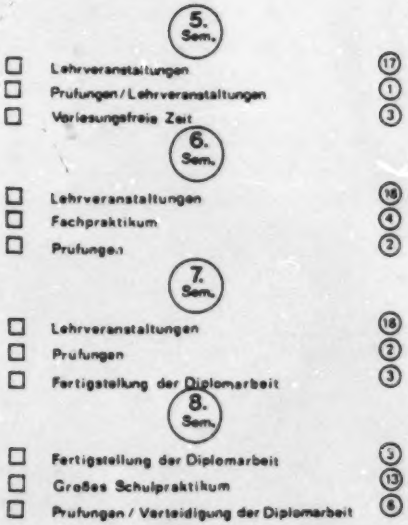


Abbildung 1 b



Hier ist die Aufteilung der zur Verfügung stehenden vier Jahre - entsprechend 8 Semester - in den zeitlichen Umfang der Lehrveranstaltungen, Prüfungen (einschliesslich der Vorbereitung darauf), zusammenhängenden Fach- und Schulpraktika, selbständigen wissenschaftlichen Tätigkeit (innerhalb der Anfertigung der Diplomarbeit) und vorlesungsfreien Zeit ersichtlich.

Dieser Rahmenablaufplan verdeutlicht, dass hier die Grundsätze und Möglichkeiten der Universitäten und Hochschulen generell mit den Belangen einer effektiven Lehrerausbildung harmonisch und sinnvoll vereint worden sind.

2.3. Im Studienplan für die Diplomlehrerausbildung sind Bildungsschwerpunkte ausgewiesen, Die in ihrem Zusammenwirken eine umfassende Bildung und Erziehung des künftigen Lehrers ermöglichen.

Die folgende Abbildung stellt die Studentafel der Fachkombination Chemie/Biologie dar. Zur besseren Verdeutlichung der Bildungsschwerpunkte haben wir diese in unserer Darstellung zu Bereichen zusammengefasst und farblich unterlegt.

Abbildung 2: Stundentafel der Fachkombination Chemie/Biologie

Stundentafel / FACHKOMBINATION Chemie/Biologie

		Stundenvolumen			
		G	V	S/U	P
1	Marxismus-Lenninismus	299	149	150	
2	Pädagogik	134	75	59	
3	Psychologie	116	30	86	
4	Politisch-pädagogische Tätigkeit	64		32	32
5	Methodik beider Fächer	250			
6	1.Fremdsprache	78		78	
7	Studentensport	212		212	
8	Sprecherziehung	12		12	
9	Technik audiovisuelle Unterrichtsmittel	16	6	10	
10	Kulturell-ästhetische Bildung	32		32	
11	Wahlweise obligatorische Ausbildung	187			
12	Mathematische Grundlagen Chemie/Biologie	64	32	32	
13	Physikalisches Praktikum	32			32
14	Allgemeine Chemie	112	48	32	32
15	Anorganische Chemie	128	48	32	48
16	Organische Chemie	108	36	24	48
17	Physikalische Chemie	135	60	30	45
18	Technische Chemie	64	32	32	
19	Chemische Schulexperimente	64			64
20	Physikal.-chem. Arbeitsmethoden	112	48	48	16
21	Makromolekular- und Kolloidchemie	48	32	16	
22	Strukturen, Mechanismen, Gleichgewichte	60	30	30	
23	Koordinationschemie	30	15	15	
24	Geschichte der Chemie	32	32		
25	Weltanschaulich-philosoph. Probleme d. Chemie	30	15	15	
26	Grundlagen der Biologie	192	84	32	96
27	Spez. Botanik und Zoologie	118	76	18	24
28	Pflanzenphys. und Biochemie	105	48	12	45
29	Physiologie d. Tiere und des Menschen	110	46	16	48
30	Ökologie, Landeskultur, Naturschutz	27	27		
31	Mikrobiologie	15	15		
32	Genetik und Abstammungslehre	46	31	15	
33	Schulbiologisches Praktikum	32			32

Betrachten wir diese Stundentafel als Übersicht, so erkennen wir folgende Schwerpunktbereiche:

Marxismus/Leninismus
Pädagogik, Psychologie, politisch-pädagogische Tätigkeit und Methodik beider Fächer
1. Fremdsprache, Studentensport, Sprecherziehung, Technik d. audiovisuellen Unterrichtsmittel, kulturell-ästhetische Bildung
Wahlweise obligatorische Ausbildung
Mathematische und physikalische Grundlagenausbildung für Chemie und Biologie
Chemie-Hauptfach
Biologie - Nebenfach

Ein gewisser Eindruck von dem harmonischen Zusammenwirken dieser Ausbildungsbestandteile kann gewonnen werden, wenn man die Gewichtigkeit der Bereiche aus dem Studenvolumen der Lehrveranstaltungen ableitet. Insgesamt sind in den vier Jahren 3060 Stunden Lehrveranstaltungen zu absolvieren, die wir hier als 100 % ansetzen wollen. Es ergeben sich somit für die Bereiche

Marxismus/leninismus	299 Stunden	=	9,8 %
Pädagogik/Psychologie/Meth.	564 Stunden	=	18,4 %
Fremdsprache, Sport usw.	348 "	=	11,4 %
Wahlweise obligatorische Ausb.	187 "	=	6,1 %
Mathemat. u. physikal. Grundl.	96 "	=	3,1 %
Chemie - Hauptfach	923 "	=	30,2 %
Biologie - Nebenfach	643 "	=	21,0 %
Insgesamt	3060 Stunden	=	100,0 %

Betrachten wir nunmehr die Studenverteilung etwas differenzierter, so erkennen wir in der Abbildung, das Gesamtvolumen der jeweiligen Disziplinen.

Weiter wird aus dieser Darstellung deutlich, in welcher Weise eine Aufteilung des Gesamtvolumens für eine Disziplin auf Vorlesungen, Seminare/Übungen und Praktika vorgesehen ist.

Betrachten wir als Beispiel jetzt einmal die vorgenommene Unterteilung am Hauptfach Chemie in die zu lehrenden Teildisziplinen. In der Abbildung sind diese Teildisziplinen in den Positionen 14 bis 25 wiedergegeben. Hier ist der gelungene Versuch unternommen worden, die bewährte traditionelle Gliederung der Chemie (in Allgemeine Chemie, Anorganische Chemie, Organische Chemie, Physikalische Chemie und Technische Chemie) mit modernen Aspekten der heutigen Wissenschaftsentwicklung (Physikal.-chem. Arbeitsmethoden, Strukturen-Mechanismen-Gleichgewichte, Koordinationschemie), pädagogisch-methodischen Aspekten (chemische Schulexperimente) und weltanschaulichhistorischen Fragestellungen harmonisch zu verbinden.
Wir sehen dass vertreten sind, die

Allgemeine Chemie	mit 112	Stunden	= 12,1 %
Anorganische Chemie	128	"	= 13,9 %
Organische Chemie	108	"	= 11,7 %
Physikalische Chemie	135	"	= 14,4 %
Technische Chemie	64	"	= 7,0 %
Chemische Schulexperimente	64	"	= 7,0 %
Physikalisch-chem.Arb.Meth.	112	"	= 12,1 %
Makromol.u.Kolloidchemie	48	"	= 5,2 %
Strukturen-Mechanism.-Gleichgev.	60	"	= 6,5 %
Koordinationschemie	30	"	= 3,3 %
Geschichte der Chemie	32	"	= 3,5 %
Weltanschaul.-phil.Probleme d.Chem.	30	"	= 3,3 %
Insgesamt	923	Stunden	=100,0 %

Für ein nach hochschulpädagogischen und hochschulmethodischen Gesichtspunkten konzipiertes Lehrerstudium ist schliesslich auch von Bedeutung, in welcher zeitlichen

Reihenfolge die einzelnen Disziplinen in dem gesamten Studiegang plaziert und auf welchen Zeitraum sie ausgedehnt sind. Die nunmehr gebrachte Ergänzung unserer Abbildung soll dies verdeutlichen.

Abbildung 3: Stundentafel der Fachkombination Chemie/Biologie

Stundentafel / FACHKOMBINATION Chemie/Biologie

		Semesterwochenstunden							
		1	2	3	4	5	6	7	8
1	Marxismus-Leninismus	3	2	4	4	3	3	1	
2	Pädagogik	2	2	2	2		1		
3	Psychologie		2	2	2			2	
4	Politisch-pädagogische Tätigkeit	2	2						
5	Methodik beider Fächer				2	6	4	4	
6	1. Fremdsprache	2	2	1					
7	Studentensport	2	2	2	2	2	2	2	
8	Sprecherziehung			1					
9	Technik: audiovisuelle Unterrichtsmittel		1						
10	Kulturell-ästhetische Bildung	1	1						
11	Wahlweise obligatorische Ausbildung					2	5	4	
12	Mathematische Grundlagen Chemie/Biologie	4							
13	Physikalisches Praktikum		2						
14	Allgemeine Chemie	7							
15	Anorganische Chemie		8						
16	Organische Chemie			9					
17	Physikalische Chemie				9				
18	Technische Chemie					2	2		
19	Chemische Schulexperimente					4			
20	Physikal.-chem. Arbeitsmethoden					4	3		
21	Makromolekular- und Kolloidchemie						3		
22	Strukturen, Mechanismen, Gleichgewichte							4	
23	Koordinationschemie							2	
24	Geschichte der Chemie						2		
25	Weltanschaulich-philosoph. Probleme d. Chemie							2	
26	Grundlagen der Biologie	9	3						
27	Spez. Botanik und Zoologie		5	3					
28	Pflanzenphys. und Biochemie			5	3				
29	Physiologie d. Tiere und des Menschen				2	5			
30	Ökologie, Landeskultur, Naturschutz			1	1				
31	Mikrobiologie				1				
32	Genetik und Abstammungslehre				2	1			
33	Schulbiologisches Praktikum						2		

Betrachten wir wieder das Beispiel der Ausbildung im Hauptfach. In den Positionen 14 bis 18 - hier sind die Disziplinen Allgemeine Chemie, Anorganische Chemie, Organische Chemie, Physikalische Chemie und Technische Chemie angegeben - zeigt sich der angestrebte Aufbau des zu absolvierenden Lehrgangs der Chemie sehr deutlich. Natürlich können Aufbau und Struktur der Ausbildung in der Chemie nicht allein aus dieser zeitlichen Abfolge eingeschätzt werden. Hier müssten die Lehrprogramme der einzelnen Disziplinen eine ausführliche Betrachtung erfahren, was aber sicher den Rahmen dieses Vortrages sprengen würde. Zu besonders interessierenden Fragen - wie etwa der des Verhältnisses von Allgemeiner Chemie zu Anorganischer Chemie und Organischer Chemie - besteht selbstverständlich die Möglichkeit weitere Auskünfte in der Diskussion zu erhalten.

Zusammenfassung

Die Ausbildung von Fachlehrern, die in den Klassen 5 bis 12 in der allgemeinbildenden polytechnischen Oberschule der DDR tätig sein werden, entspricht Grundsätzen, die nachfolgend noch einmal wiederholend zusammengefasst dargestellt sein sollen:

1. Die Ausbildung der Fachlehrer erfolgt an Universitäten und Hochschulen und führt zu der Qualifikation "Diplomlehrer".

2. Das Studium erfolgt komplex in zwei wissenschaftlichen Fächern (die als Fachkombination die Qualifikation des Fachlehrers ausmachen), dem Marxismus-Leninismus, den pädagogisch, psychologischen und methodischen Disziplinen und bestimmten Bereichen einer erweiterten Allgemeinbildung

3. Der Ausbildungsgang ist in sich geschlossen und systematisch nach wissenschaftlichen und hochschulpädagogischen (hochschuldidaktischen und hochschulmethodischen) Erkenntnisse aufgebaut.

4. Der Ausbildungsgang ist mit Ablegung des Examens soweit abgeschlossen, dass der Absolvent in der Lage ist, seine Tätigkeit als Fachlehrer erfolgreich aufzunehmen. Er wird dann in das System der Lehrerweiterbildung einbezogen.

5. Das Diplomlehrerstudium umfasst vier Jahre.

Diese Form der Lehrerausbildung hat sich in unserer Republik seit über 10 Jahren bewährt, wenn wir von geringfügigen Veränderungen der Studienprogramme einmal absehen. Sie ist aus Grund vielfältiger Erfahrungen unserer Lehrerbildung und die unserer befreundeten Staaten entwickelt worden. Natürlich haben wir noch nicht den Endpunkt der Entwicklung erreicht. Auch jetzt werden Untersuchungen in Angriff genommen und Diskussionen gefürt, die das Ziel haben, für die kommende Zeit weitere Verbesserungen zu erreichen. Dazu dient auch die umfassende Ausvertung der bisher erzielten Ergebnisse, wobei besonders gewichtig die Frage ist, wie sich die ausgebildeten Absolventen in der Praxis ihrer beruflichen Tätigkeit als Lehrer und Erzieher der jungen Generation bewährt haben.

The Background for Describing the Model

by
Hans Jørgen Kristensen

The teacher education in Denmark is based on a law from 1966 and a ministers order from 1969. Ordinarily the student teachers use 3 1/2 - 4 years to pass through the education.
The teacher education consists of a lot of subjects which can be grouped as follows:

1. There is a lot of subjects which the student teachers should be able to teach in the folk school (the public school) from form 1 to 10. Every student teacher must study 10 of these subjects, two of them with a higher grade of specialization than the other ones.

2. There is af few subjects on teaching (didactics, pedagogy and educational specialization)

3. There is two subjects on children and youngsters (psychology and educational specialization).

4. And there is practice in 112 hours and in a period of 12 weeks. In the practice the student teachers have to try teaching, while the subjects mentioned under point 1 - 3 are highly theoretical.

Behind the anatomical structure of the teacher education which you can notice behind the different types of subjects indicates a concept of a teacher as a professional who has to teach something to somebody.

This concept of a teacher is too narrow in the public school in Denmark today where the teacher has a lot of others tasks, too. And the concept is tendentially wrong

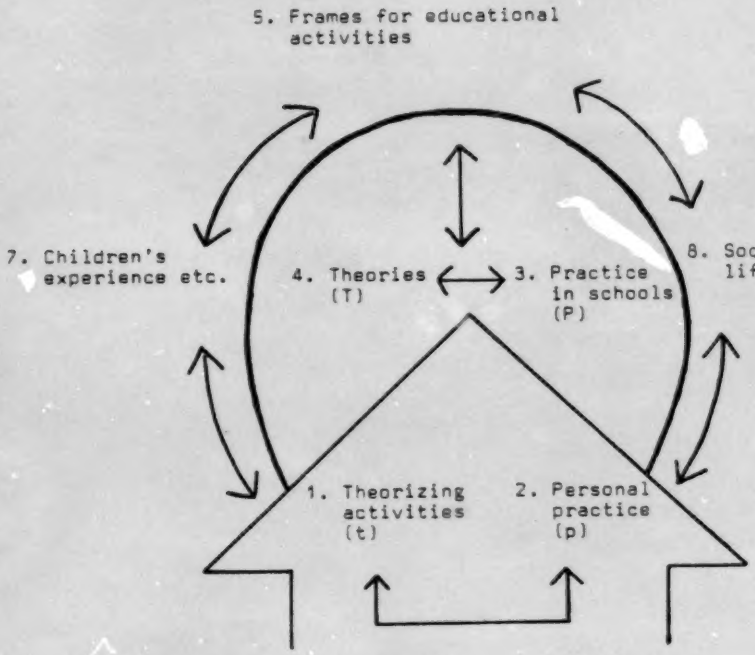
because the purpose in the law for the public school is seeing the teachers job as that to lead and inspire a development and learning process in cooperation with the pupils.

Between the different subjects and t[illegible]ifferent types of subjects there are no organized connections, which could be able to establish a kind of context which could make it clear for the student teacher what is the focal point for his job as a teacher. The subject-didactic which is placed in the subjects from point 1 above should after its purpose build a bridge between the pedagogical subjects and the other subjects and between the theory in the teacher education institution and the school, but it does seldom function very well.

If we want to build up at teacher education which is able to give the student teachers better possibilities to do their work in the school the traditional model for an educational institution can not be used. The education must function as a whole around some central focal points which are formulated from studies of the teachers tasks in the school. The key concept could be teacher qualifications.

The rest of this paper is a very short description of a model for a workable teacher qualification.

The model illustrated


5. Frames for educational activities
7. Children's experience etc.
4. Theories (T)
3. Practice in schools (P)
8. Social life
1. Theorizing activities (t)
2. Personal practice (p)

A description of the model

1) A model for use in the collective planning of the studies and work of a teacher training institution, within the frames given for the students and the teachers - containing possibilities for an integration of the educational and the psychological subjects and the subject-didactic.

2) A model for use in planning the frames of a teacher training institution, describing the subjects of the teacher education as a whole, not as extremely separated subjects - as in the Danish teacher training system of today.

Perhaps it may be possible - too - to operationalize the model for use in empirical investigations about teacher qualifications and teacher training.

The concept of a teacher qualification is that of an independent, interpretating and acting professional in the school of a democratic and pluralistic society.

The model consists of seven elements which only analytically can be described separately. The integration and the cooperation between them is quite fundamental for the workability of the model.

Element no. 1: Theorizing activities (t)

This element comprises the teachers' and the student teachers' own theorizing activities with starting point and base in their experience from practice in school and in the teacher training institution.
The individual and the collective theorizing must be given mush space in the studies and must be used in connection with the other elements.

Element no. 2: Personal practice (p)

This element comprises the teachers' and the student teachers' own practice in practice-periods in school and in the work with planning and carrying out their own teaching activities and learning activities in the teacher training institution and in administration of the teacher training institution. Their practice comprises all kinds of teacher tasks in public school and in the teacher training institution.

Elements no. 1 and 2 are the fundaments for the elements no. 3-7, and are characterized by participation. The following elements are characterized as objectfields for studies.

Element no. 3: The practice in the public school (P)

This element comprises knowledge of the actual work in the public school as a matter of fact.
There must be taken several aspects of the educational work in consideration, its planning, carrying out and evaluation, and the typical diversity of this work in different schools in a decentralized school system as the Danish.
Realism is a central word for the work and studies about the practice in the public school, but the questioning of why things are done in different manners in the schools is important, too.
The student teachers' must also learn about possible alternative solutions to tasks and problems.

Element no. 4: Theories (T)

This element consists of different professionally developed theories from pedagogy, didactics, psychology, philosophy and the social sciences.

The student teacher must learn about selected theories and they must learn in which ways the theories can be usable in relation to practice and the conditions for that, the conditions in school and the conditions lying behind the development of the theories.

It is very important for the student teachers to learn that the theories are not directly usable in practice and that they are not usable in all kinds of practice. If the students do not understand that they will get wrong expectations to the educational theories and after a few years they will have lost their confidence in educational theory.

Element no. 5: Frames for educational activities

This element consists of knowledge about the frames for the educational activities in the public school, which can be promoting or restraining for the teachers intentions and work.
The frames are juridical, economical, physical, structural etc.
On the short view the frames cannot be changed, but on the longer view they can, and it is possible for the teacher to participate in this changing.

Element no. 6: Knowledge about society

This element consists of knowledge about society, its historical and actual situation, and the driving forces in this society.
It is necessary for the teacher to have direct experience from social and societal life and to know central theories about development of society.

Element no. 7: Experience with children outside school and institutions

The teacher must have a direct knowledge of children and youngsters from having participated in real life situations with them. It is not enough for the teacher to know children and youngsters from school.
It is necessary to have a thorough knowledge of the way children and youngsters experience, think and feel, their hopes and criticisms.

In the teacher training many periods of work and studies must comprise all the seven elements as an integrated whole.

During periods of studies concentrating on single elements, the other elements and the connections must always be visible.[1)]

1) A more detailed description in Danish is available on application to the author.

An Evaluation of the Relative Effectiveness of Different Training Systems in Teacher Training

by

Arye Perlberg and Ehud Bar-On

INTRODUCTION

The purpose of this study was to evaluate the relative effectiveness of different training systems used in teacher training. Since 1970, the Technion's Laboratory for Research and Development in Teaching and Learning has investigated various training systems, aimed at improving the teaching proficiency of the student teachers. The principal component of all the systems tested was the teaching laboratory, with closed-circuit television serving as the main method of feedback. In this study, the relative effectiveness of four of the systems tested over the years was evaluated. These four are as follows:

1) Training focusing on the teaching of one skill at each class meeting. This method accords with the traditional model of micro-teaching developed at Stanford (Allen & Ryan, 1969) and will henceforth be termed FSS (Focusing on a Single Skill).

2) Training in which the micro-lesson is not limited to a single skill, and feedback is based on a diagnostic observation instrument developed at the Technion (T.D.S., or Technion Diagnostic System).

3) A system that was a combination of 1) and 2).

4) A system in which neither 1) nor 2) was employed. The treatment in the micro-lesson was general, without focusing on one skill and without the use of an observation instrument.

THEORETICAL BACKGROUND

More than 100 observation instruments were published in the anthology Mirrors for Behavior (Simon & Boyer, 1973), and many more observation instruments have been published in Interaction Analysis Newsletter and other publications. A considerable proportion of these observation

instruments are not based on a defined theoretical structure, but are rather a collection of behaviors that the author of the instrument found from his personal experience to be interesting objects for observation. This lack of theoretical structure has been criticized by Biddle (1967) and Rosenshine & Furst (1973), who surveyed many of the observation instruments, and it reflects the general condition of current research of methods of teaching, and touches on the main theoretical problem of this study, that of classification and dimensionalization.

The problem of dimensionalization (Medley, 1967; Gage, 1969) refers to finding ways of comparing different behaviors that appear in the teaching situation on the basis of what Gage termed "basic dimensions", so as to be able to distinguish similarities and differences among them. (The authors of this paper prefer to speak of a common meaning of order in the behavior groups and to limit the use of the term "dimensions" to geometrical representation (for example, Euclidean Space) in which the space is defined.) Gage (1969)[1] distinguished between the logical and the empirical approaches in the problem of classification. One use of the logical approach involves defining the collection of "technical skills" of teaching and specifying a possible order for this collection (Bush, 1966; Allen & Ryan, 1969). Another use is exemplified by the anthology of observation instruments, Mirrors for Behavior, previously mentioned, in which the editors classified the behaviors observed according to various criteria, such as affective, cognitive, behavioral, verbal and nonverbal, etc.

The empirical approach is based on the use of factor analysis: the classroom behaviors of interest are measured by a large number of variables. The factors obtained are dependent on the variables that are entered into the analysis; therefore, it is important to select these variables systematically. An accepted way of measuring teaching behaviors is through

[1]This discussion is based on Gage's analysis in his article on Research on Teaching Methods that was published in the Encyclopedia of Educational Research. The interested reader may refer to that article for a more detailed discussion.

observation instruments that make use of categories. These need to be mutually exclusive ... not overlapping, but, nevertheless, exhaustive of the area in which the researcher is interested. For the purpose of building categories of observation instruments, Gage recommends the facet approach that was proposed by Guttman (1954a, 1954b: 57, 66, 68, 72) as "a promising approach" to a solution to the problem of the systemization of observations and dimensionalization of behaviors in the classroom. In another paper of Bar-On & Perlberg (1974), it was shown that the building of an observation instrument of facets ordered in the same meaning, facilitates a better understanding of the instructional process and contributes to creating a theory of instruction. In this paper, we shall use an observation instrument that was developed at the Technion both as a training instrument and as an instrument for the evaluation of the effectiveness of the teaching. The instrument is called the Technion Diagnostic System (TDS).

THE OBSERVATION INSTRUMENT

The Technion Diagnostic System (TDS) is an instrument for the systematic observation of a lesson, by which the lesson is divided into units of time of three seconds each, and for each such unit a trained observer records one of 36 possible categories. The 36 categories are all the ordered pairs of:

$$a_i b_j (i, j = 1,2,\ldots, 6; a_i \in A; b_i \in B)$$

Facet A describes the level of student or teacher activity and includes the following elements:

a_1 - teacher lectures	a_4 - student answers
a_2 - teacher asks	a_5 - student asks
a_3 - teacher relates	a_6 - student initiates

Facet B describes the levels of student thinking and includes these elements:

b_1 - knowledge	b_4 - analysis
b_2 - comprehension	b_5 - synthesis
b_3 - application	b_6 - evaluation

IDS is designed such that in facet A the activities of the teacher are ordered according to the degree of participation that they elicit from the student (from a_1-low through a_6-high). In facet B the levels of thinking are ordered by the extent of student intellectual stimulation (from b_1-lowest through b_6-highest).

Because the order of the elements in each of the two facets has a common meaning in the direction of rising student stimulation, a partially ordered group may be created from the range of categories that will enable, with the aid of certain directives, calculation of a general score for each lesson.

The uniqueness of this observation instrument in comparison to similar instruments is that its categories create partially ordered groups, which has many advantages, both for statistical calculations (like that which enables calculating a single general score for the lesson) and for the possibility of graphic displays. Algebraically, this may be written in the following form:

$$a_6 \underset{A}{>} a_5 \underset{A}{>} \ldots \underset{A}{>} a_1 \qquad\qquad b_6 \underset{B}{>} b_5 \underset{B}{>} \ldots > b_1$$

where $\underset{A}{>}$ means "greater than" in the meaning of the Culling rule for group A (student activation level) and $\underset{B}{>}$ means "greater than" in the meaning of the Culling rule for facet B (student intellectual activation)

$$\underset{A}{>} \curvearrowright \underset{B}{>} \curvearrowright >$$

Student stimulation level

In other words, the elements in facet A are ordered according to the same meaning by which elements in group B are ordered, i.e. degree of student stimulation. Facet A, the activity levels facet, is an ordered group of activities in which the first activity (a_1) will flow from the student minimally, and the last category (a_6) will flow from him maximally This is also the rule for the order of facet B, thinking levels, which ranges from the least degree of student stimulation to intellectual thinking (b_1) to a great measure of stimulation to intellectual thought (b_6)

The order of activities of facet A includes three teacher activities followed by three student activities. However, if we keep in mind that the teacher's goal, even when talking, is activating the student, it will make it easier for us to understand that even the teacher's lecturing arouses the student to some activity, if only that of listening. A greater degree of activation will be caused by the teacher's questioning, which activates the student in the direction of searching for an answer. The reaction of the teacher to students' answers will also arouse reactions on the part of the students, even if the expression of these reactions is not always verbal. When relating to the words of the student, the teacher is not the initiator of but a reactor to the student's act.

The three student activities are also ordered by an increasing order of student involvement initiative: from "student replies", "student asks", and to "student initiates".

In facet A, six ordered pairs of two sub-facets may be seen:

α - the person who is speaking
α_1 - teacher
α_2 - student
β - the degree of verbal initiative by the teacher
β_1 - teacher lectures
β_2 - asks
β_3 - responds

The order of the sub-facet is the opposite for the student, since all the ordered pairs of the type $\alpha_i\beta_j (i = 1,2; j = 1,2,3)$ are ordered by the degree of activation and the increasing initiative of the student

From this, it follows that the activity and involvement of the student are also found, in an increasing extent from category to category, in the background of the teacher's activity. This assumption is at the basis of specifying the order for facet A similar to that of facet B.

The integrated use of training systems in micro-teaching and observation instruments was recommended by the developers and users of these systems: Allen & Ryan, 1969, and Flanders, 1970.

The literature describes many studies in which an attempt is made to evaluate the effectiveness of the use of these systems separately and interactively (Rosenshine & Furst, 1973).

In the micro-teaching system, the training is focused in each lesson on an individual skill, and the goal of the training is to improve the execution of this teaching skill. Feedback is based on observation, in which a count is made of the number of times the individual behavior took place - for example, the number of questions that the teacher asked.

In training based on a system of observation, emphasis is placed on what takes place in the lesson as a whole and on changing the structure of the lesson. All the behaviors are recorded according to the categories to which they belong and ratios between frequencies of different categories are calculated. The aim of this training system is to change the ratio between frequencies.

THE RESEARCH

The two laboratory training systems were tested in this research. For testing purposes, we used the following factorial design:

	TDS-Technion Observation Diagnostic System	
	Applied	Not Applied
Applied	(3) N* = 32	(1) N = 32
Single Skill(FSS)		
Not Applied	(2) N = 32	(4) N = 32

*N equals the number of participants in the test group. The numbers in parentheses refer to the treatment methods, described below.)

(1) Focusing on a Single Skill (FSS)

In this group, the whole exercise hour focused on an individual skill. Group discussions were related to the level of execution of the single skill. Skills were practiced, such as developing or creating preparedness (set induction), probing questions, high-order questions, uses of examples, use of teaching aids, etc.

(2) Feedback in the Technion Observation Diagnostic System (TDS)

The supervision and the discussion here were focused on the relative frequency of use of various teaching behaviors and the quantitative relation between them, for example, the relation between the duration of teacher's talking and students' talking. As a basis for discussion, computer analysis results that included frequencies of behaviors and their intercorrelations were used. The scores that were given related to the scope of student involvement during the course of the lesson and the level of cognitive thought in this involvement. The discussion centered on the problem of how to increase student involvement at the highest possible cognitive level.

(3) Focusing on a single skill (FSS) in conjunction with TDS

The emphasis in this system with this group was put on the training of single skills. Concommitantly, students were asked to increase the involvement of their students at the highest possible cognitive level. Two observers (from among the students) coded the interaction in the lessons every three seconds according to TDS. Supervision focused on an individual skill, as mentioned in treatment (1), and on the general teacher or student interaction.

(4) General supervision

The supervision in this group was general. In the course of the discussions, students did not focus either on an individual skill or on TDS categories. The adviser and the student offered the 'teacher' suggestions and ideas for improving the lesson. These discussion touched on all the ideas that were emphasized in the other groups, since these were all relevant to this course. But in this test group, it was not done systematically.

THE POPULATION STUDIED

The population studied was composed of groups of students in the Technion's Department of Education in Technology and Science, who were enrolled in the Principles of Teaching Methods course. The laboratory practice was part of the course requirements. The study lasted two years, and the sessions were conducted over four semesters, 15 hours each semester.

It may be assumed that the backgrounds of the students in this course were similar. For example, they all had similar training in education and psychology, in addition to being students of science and technology. It may be presumed, therefore, that they were very similar [illegible] academic background.

THE LABORATORY TRAINING

The training was given in the micro-teaching laboratory. Each test group was divided into groups of four students and an adviser. Each student taught one lesson a week, in an area in which he specialized, to 7th graders (intermediate school).

The duration of the lesson was five minutes. The lesson was video-taped for close-circuit use, and afterwards a discussion took place which lasted 15 minutes, the purpose of which suited the particular treatment method of the test group. This discussion served as feedback for the student; in addition to the feedback of colleagues and adviser, the student received feedback through observing the videotape.

The advisers were trained to supervise in a manner that was consistent with the treatment being administered to the group they were supervising and for this purpose also received written directives. From time to time, the supervision itself was filmed for the purpose of testing whether it was consistent with the treatment. Most of the advisers were supervised throughout the study.

VARIABLES OF THE STUDY

The independent variables were the four different training laboratory methods described above. The dependent variables were the relative frequencies of different teaching behaviors by means of the Technion's Observation Instrument, TDS.

DATA SOURCES

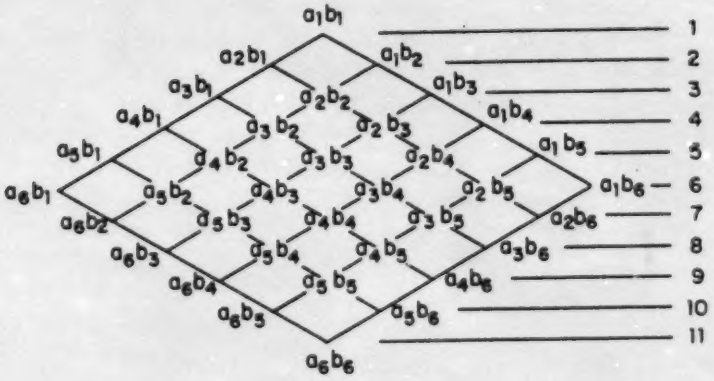
The first lesson (pre-test) and the last lesson (post-test) of all students in each semester were coded according to TDS. A 5-minute lesson was divided into 100 units of 3 seconds each, and each of these sub-units was coded according to one of the 36 possible categories. The coding

was done by three coders who were especially trained. (The reliability coefficient among the coders was .86.) The same instructions were given to students in the four test groups prior to the first and last lessons. At a relatively early stage, the students were told that their 5-minute lesson would be analyzed according to the method described below.

LESSON EVALUATION

Each 3-second time-unit was mapped into a category according to facets A and B. The TDS category in which this time-unit was mapped would be, then, a structuple of these two classifications. In other words, if time-unit t were mapped into element a_i according to facet A and into element b_j according to facet B, the TDS category would be the structuple $a_i b_j$ ($i = 1,1,\ldots,6$; $j = 1,2,\ldots,6$). For example, a certain time-unit could receive the structuple $a_5 b_3$, which would mean the student asks at the level of application. The elements in facet A are ordered, as mentioned, from the point of student activation, such that $a_6 > a_5 > \ldots > a_1$. In the same manner, it may be said that different levels of thinking in Bloom's taxonomy represent different levels of intellectual activation, such that $b_6 > b_5 > \ldots > b_1$.

The assumption that lies at the basis of TDS is that the meaning of the order in two facets is comparable (degree of student stimulation). From this, the following partially ordered group may be produced:



In order to know which score each structuple will receive, the indices have to be added up and reduced by 1. An example:
$a_5b_3 = 5 + 3 - 1 = 7$.

The illustration above shows what score each structuple receives of the 100 scores given for a 5-minute-class unit. But it also shows that there is no distinction between the score of structuple a_2b_4 and a_4b_2; for, with the exception of a score of 1, which is the lowest, and a score of 11, the highest, each score has 1 or more equivalents as its number in the same horizontal line. The giving of an identical score to a_1b_2 and a_2b_1 stems from the assumption that these structuples cannot be compared, and therefore are arbitrarily assigned the same values. The first is higher in facet B, while the second is higher in facet A. Since we are not willing to determine a prevailing facet (in the nature of principal classifier and second classifier), we rather allow the two classification tests to be of equal importance. The implication is therefore that we are unable to decide which of the two structuples is higher from the standpoint of student activation. The general score is reached by a summation of the 100 scores that are given for the 100 time-units of the lesson. Thus, the same general score may be reached through several different combinations. The range of scores for determining a general score can run between 100 (if throughout the entire lesson the teacher lectured at a knowledge level) and 1100 (if throughout the lesson the student initiated an an evaluative level). Furthermore, it is important to remember that at the time of acquiring individual teaching skills, like that of asking high-order questions, the most that the TDS can give as a score will always be less than the top score. On the assumption that the questions at a certain level may elicit answers at the same level, the top score that can be achieved for this specific skill may be calculated in the following way:

$$100\ (a_4b_6) = 100\ (10 - 1) = 900, \text{ and}$$

means that throughout the class, the student(s) respond(s) at the evaluative level.

But even this score is only theoretical. If we remember that in order for the students to react over a certain time span at an evaluative level, the teacher must ask questions at the same level, at least in some of the

5-minute lessons, that is, the structuple a_2b_6 must constitute a certain percentage of the lesson. The practical meaning of this is that the top general score can be achieved in order to show a mastery of this skill must at the outset be lower than 900.

DATA ANALYSIS

The frequency of each of the 36 categories was calculated for every group. Eight categories were found to have the highest frequency in all four groups, covering more than 80% of each lesson. Since they reflected the scope of student involvement and thinking level, it was decided to use only these categories for the analysis. Following are the eight categories:

1.	Teacher lectures at the knowledge level	a_1b_1
2.	Teacher lectures at a high level*	$a_1b_{1\text{-}6}$
3.	Teacher asks at the knowledge level	a_2b_1
4.	Teacher asks at a high level	$a_2b_{2\text{-}6}$
5.	Teacher reacts at the knowledge level	a_3b_1
6.	Teacher reacts at a high level	$a_3b_{3\text{-}6}$
7.	Student reacts at the knowledge level	a_4b_1
8.	Student reacts at a high level	$a_4b_{4\text{-}6}$

The general score (GS) for each lesson was calculated on the basis of the frequencies of the different categories. In order to bring the range of scores within the limits that are usual for teachers, the calculation may be done like this:

$$GS = K_1 + K_2 \sum_{i=1}^{5} x_i y_i$$

where:

x_i = the score of level i (i=1,2,...,5)
y_i = number of 3-second units that receive score x_i
K_1 = arbitrary constant for transferring the average
K_2 = arbitrary constant for determining the extent of the distribution around the average

*In the data analysis, it was decided to combine the thinking levels b_2-b_6 into one category termed "high-level" (thinking levels: comprehension, application, analysis, synthesis, evaluation).

The constants used were $K_1 = 40$ and $K_2 = 0.1$.
Use of these constants gave a normal distribution around an average of 70, a standard deviation of 26, and a range of 40-100.

RESULTS

As can be seen from Table 1, the values of F for the ratio MS covariate/MS error are low and statistically insignificant in all cases. The regression coefficients for all hypotheses show that there is no linear relationship between pre-test and post-test scores. This finding accords with what we found in a previous study (Perlberg et al., 1974).

TABLE 1

Values of F for the Covariate

	Teacher Lectures	Teacher Asks	Student Responds	Teacher Responds
High level	6.39	0.24	3.63	1.40
Low level	0.24	0.08	2.10	0.33

In addition, we used the common analysis of variance for ascertaining whether differences existed in the pre-test grades among the four groups, and since no statistically significant differences were discovered at the beginning level, we used analysis of variance, rather than covariance, on the post-test scores to examine the impact of the treatments.

Table 2 summarizes the effects of the FSS, the TDS and the interaction between the two.

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TABLE 2

Mean Frequencies, Values of F and ω^2 for Nine Post-Test Grades

		Tchr.Lect. Know.Level (1)		Tchr.Lect. High Level (2)		Tchr. Asks Know.Level (3)		Tchr. Asks High Level (4)		Tchr.Reacts Know. Level (5)		Tchr.Reacts High Level (6)		Stud.Reacts Know. Level (7)		Stud.Reacts High Level (8)		General Score (9)	
		TDS		TDS		TDS		TDS		TDS		TDS		TDS		TDS		TDS	
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
FSS	Yes	25.7	41.2	4.9	1.7	17.0	13.6	11.3	3.2	6.9	9.9	5.1	0.7	9.8	22.3	9.1	2.6	76	72
	No	13.3	47.4	12.2	0.6	7.4	13.2	12.3	2.0	4.5	8.1	6.9	0.3	10.5	18.6	18.6	0.6	90	60
TDS	F	48.27*		34.92*		1.00		68.56*		18.46*		82.33*		33.02*		70.68*		28.3*	
	ω^2	0.26		0.19		-		0.23		0.11		0.38		0.20		0.32		0.07	
FSS	F	0.032		5.93		16.41*		0.00		7.70*		1.33		0.7		6.38		0.7	
	ω^2	-		0.03		0.10		-		0.04		-		-		0.03		-	
Int.	F	4.49		11.12*		13.85*		0.93		0.22		3.71		1.4		15.68*		17.50*	
	ω^2	0.02		0.06		0.08		-		-		0.01		-		0.07		0.04	

* $p \leq 0.01$ ($F(1, 123) = 6.85$)

Similarly, we calculated the statistic ω^2, which is the percentage of variance explained by each factor (ω^2 is proportional to the reduction in variance of one variable, with the second variable given). The averages are presented in this table in order to enable the reader to see the direction of difference among the four treatments.

For purposes of brevity, the impact of the traditional general supervision (treatment 4), which was conceptualised primarily as a 'control', can be summarized as consistently among the least effective treatments and will not be referenced separately for each dependent variable.

The results can be summarized in the following manner:

1. The most effective system for reducing the relative quantity of time devoted to "lecturing at the knowledge level" was TDS training. This training reduced the quantity of time in which the teacher lectured at the knowledge level to 13.3% of the lesson; while use of a combined TDS-FSS system reduced it less, to 25.7% of the lesson.

   Training under FSS resulted in about 41.2% of the lesson, on the average, being devoted to lecturing at the knowledge level. The difference in effectiveness among the systems seems clear.

   The effect of the TDS system is statistically significant ($p < 0.01$), and the value of ω^2 is 26%.

2. The highest percentage of "lecturing at a high level" was achieved with TDS (12.2%); the lowest obtained with FSS (1.7%). The combined use of the two systems gave an intermediate value of 4.9%. The effect of TDS and of the FSS-TDS interaction was significant in both instances, with the ω^2 values of TDS, the FSS-TDS interaction, and FSS alone being 19%, 6%, and 3%, respectively.

3. The FSS system had a clear effect on increasing the number of "knowledge questions". The combined FSS-TDS resulted in the highest percentage of "knowledge questions" despite the fact that TDS itself had no effect in increasing the quantity of questions.

4. For increasing the number of "high-level questions", TDS was shown to be the only effective system; FSS had no statistically significant effect, either alone or in conjunction with TDS. TDS explained 23%

of the variance, and the average percentage of time that was devoted to asking questions at a high level was 12.3% (in contrast to 3.2% with FSS).

5. In the category of "teacher relates at a knowledge level" to what student says, both TDS and FSS had significant effects but in opposite directions: increasing the percentage of time devoted to this behavior for FSS (9.9%) and reducing it for TDS (4.5%).

6. In the category of "teacher relates at a high level" to what student says, TDS had a significant and strong positive effect (explaining 38% of the variance), while FSS had almost no effect at all.

   The average time devoted to this category during final examination for those who learned the TDS system was 6.9%, whereas those trained with FSS devoted only 0.7% of the time.

7. "Student's answer at the knowledge level" was affected principally by training in TDS (explaining 20% of the variance), with its effect in the direction of reducing the percentage of time devoted to this category (10.5%).

8. In increasing the frequency of "student reacts at a high level", TDS was the only system to be effective. The treatment explained 32% of the variance and the mean for this training group was 18.6%. With FSS the mean was 2.6% and the explained variance only 3%. In this case, the interaction between the two was significant, statistically.

9. As for the General Score (GS), the only significant main effect was that of TDS (despite the interaction being statistically significant).

In summarizing the results, we can say that the proportion of behaviors in those categories that included thinking at a high level were increased by TDS training, while skills at the knowledge level were influenced more by the FSS training system.

DISCUSSION

This research and its results have implications for two areas:

A) In the area of comparative research into different laboratory training systems for skills in instruction and guidance;

B) In the area of learning theories connected to the wholistic approach as compared to the atomistic.

From the mid-1960s there developed among those working in the area of teacher training a recognition of the importance of the laboratory for training in teaching and guidance skills (which was also called a micro-teaching laboratory). In the context of the work in these laboratories, various systems have operated similar to those investigated in this study, as have variations of these systems; that is, different emphases on skills, feedback, various observation systems, etc. Despite the fact that 15 years have already passed since the development of this movement, there is little comparative research on the effectiveness of these systems.

In a critical review of an anthology of new research in micro-teaching by McIntyre et al (1977), Perlberg (1978) surveys the international literature on the subject and concludes that despite the demand for research studies on these topics that was presented by the developers of the system (Allen & Ryan, 1969), the studies in the area are few. Thus, research that examines various widespread training systems can make a special contribution. In this connection, it would be fitting to quote what Allen & Ryan wrote in the introduction to their book:

> "The questions that are raised by microteaching, at least at this point in its evolution, far exceed the answers it has been able to supply. Microteaching currently has the same promise, and the same danger, that newly devised research and training techniques have always had: the promise of opening entirely new avenues, perspectives, and alternatives to human exploration; the danger of locking in too early on a first alternative which arose purely out of chance and convenience."

In a special chapter on research, the authors describe many research directions that are suitable for undertaking. But despite their words having been published ten years ago, not much has been done in this area.

The results of this study show that for achieving a basic mastery of skills, such as number of questions asked at, or relating at a knowledge level, effective training is that which separates the teaching process into particular skills and focuses on the acquisition of each one individually. The percentage of time devoted to these skills in a lesson is thereby increased. In contrast, when it comes to behaviors at higher thinking levels, TDS had better results than did FSS or the integrated FSS-TDS.

A theoretical analysis of lesson patterns that received high general scores shows the following process:

Since the length of the lesson is fixed, it is impossible to increase the percentage of all activities, and an increase in the proportion of one behavior will come at the expense of the other behaviors. Student responses and initiatives at a high level receive the highest scores; therefore, in order to achieve a high score, the proportion of these behaviors in a lesson must be increased as much as possible. To attain this goal, the teacher must ask questions at a high level and ask as few knowledge questions as possible. But for the teacher to be able to ask and receive high-level student reactions, he must increase the percentage of lecturing at a high level, despite the fact that every three seconds of such lecturing receives a low score. The teacher also has to lessen the time in which he relates at the knowledge level in order to make time for relating at a high level to what the student says.

Focusing on a single skill at each session improves the teacher's mastery of this skill, but better mastery of each skill separately does not necessarily lead to an improvement in the lesson as a whole. In order for the lesson as a whole to improve, a strategy must be developed for optimizing both the quantity of time devoted to each behavior and the order of implementing the skills. In the system in which TDS serves as the principal feedback system, the trainee learned that in order to earn a high score (students' responses and initiatives at a high level), he "pays" with a certain percentage of time for activities that receive a low score (his analysis of the problem that is presented). On the other hand, if his lecturing exceeds the minimum required, he will receive a lower score than that which he could have received if he had opened this stage of the lesson to students' responses and initiatives.

In contrast, training in a single skill, like "asking questions at a high level", did not lead to a higher general score: the students who were not prepared as they should be did not reply, the disturbed teacher descended into explanations (lecture), and the general score was low because the teacher did not take the optimum strategy.

One of the additional possibilities is a combination of FSS and TDS. Training in particular skills would be carried out in the early stages of the teacher training and the use of TDS in the next stage, in which the trainee learns to develop optimum strategies in order to obtain the involvement of students and high levels of thinking.

As said above, another aspect of this study relates to the theoretical differences of opinion between the followers of the wholistic approach and the advocates of an atomistic approach. In this study, the TDS training system represents the former and FSS the latter.

The findings of this study do not negate any specific system or decisively favor one over the other, but one can infer that to achieve specific aims, such as acquiring basic skills at an elementary level, single skills training is preferable; while for training for higher level thinking skills, TDS is preferable, the latter system being diagnostic and relating to the general structure of the lesson.

Despite the popularity of micro-teaching systems and the focusing on single skills training, the users of these systems are criticized: teaching is a complex process, difficult to break down into skills. Moreover, even if this were possible to do, there is no assurance that mastery of each skill guarantees mastery in the strategies of their use. That there is much truth to this point must be acknowledged.

The experience showed that many of the advocates of micro-teaching training took to the system with great enthusiasm and started training in single skills out of a hope that they would arrive at more wholistic training in the strategies of the use of these skills. As it happened, because of the difficulties brought on by defective organization or the paucity of time devoted to acquiring laboratory experiences in teaching skills in comparison to theoretical learning, no time was devoted to training in teaching strategies.

In light of the above, training in teaching laboratories must be designed in a manner that will enable the acquisition of basic skills, on the one hand, and teaching strategies, on the other.

BIBLIOGRAPHY

Allen, D.W. and Ryan, K.A. Microteaching. Reading, Mass., Addison-Wesley, 1969.

Bar-On, E., and Perlberg, A. Der Facetten-Ansatz bei der Entwicklung einer Unterrichtstheorie, Unterrichtswissenschaft, Heft, 2, pp. 41-60, Beltz Verlage Weinheim und Basel, 1974.

Biddle, Bruce J. Methods and Concepts in Classroom Research. Review of Educational Research, 37:337-357, June 1967.

Bush, Robert N. The Science and Art of Educating Teachers. Improving Teacher Education in the United States. Stanley Elam (Editor), PDK, 1966, pp. 35-62.

Flanders, Ned. Analyzing Teacher Behavior. Reading, Mass., Addison-Wesley, 1970.

Gage, N.L. Teaching Methods. Encyclopedia of Educational Research, Fourth Edition. Robert L. Ebel (Editor). London, Macmillan, 1969, pp. 1446-1458.

Guttman, L. "A New Approach to Factor Analysis: The Radex". Mathematical Thinking in the Social Sciences. Paul F. Lazarsfeld (Editor), Glencoe, Ill., The Free Press, 1954, pp. 258-348.

Guttman, L. "An Outline of Some New Methodology for Social Research". Public Opinion Quarterly, 18:395-404, Winter, 1954-5.

Guttman, L. "Introduction to Facet Design and Analysis". Proceedings of the Fifteenth International Congress of Psychology, Brussels, 1957. Amsterdam, North-Holland Publishing Co., pp. 130-132.

Guttman, L. "The Nonmetric Breakthrough for the Behavioral Sciences". Proceedings of the Second National Conference on Data Processing, Information Processing Association of Israel, 1966, pp. 495-510.

Guttman, L. "A General Nonmetric Technique for Finding the Smallest Coordinate Space for a Configuration of Points". Psychometrika, 33:469-506, 1968.

Guttman, L. "Three Guttman-Lingoes Families of Computer Programs for Nonmetric Data Analysis". Presented to Workshop on "Multidimensional Scaling" at University of Pennsylvania, June 7-12, 1972.

Medley, Donald M. "The Language of Teacher Behavior: Communicating the Results of Structured Observations to Teachers". Paper presented at the annual meeting of the AERA, New York, 1967.

McIntyre, D., MacLead, G., and Griffiths, R. (Eds.), Investigations of Microteaching. London: Croom Helm, 1977.

Perlberg, Arye et al.,"Modification of Teaching Behavior through the Combined Use of Microteaching Techniques with the Technion Diagnostic System TDS." Instructional Science 3 (1974), pp. 177-200.

Perlberg, Arye. Book review of Investigations of Microteaching. In British J. of Teacher Education, Vol. 4, No. 3, October 1978.

Rosenshine, B., and Furst, N. The Use of Direct Observation to Study Teaching. Second Handbook of Research on Teaching - A Project of the American Educational Research Association, edited by Robert M.W. Travers, Rand McNally & Company, Chicago, 1973, pp. 122-183.

Simon, A., and Boyer, E.G. (Editors), Mirrors for Behavior: An Anthology of Classroom Observation Instruments. Vols. I-XVII. Philadelphia, Research for Better Schools, Inc., 1967-1973.

Appendix I

Hytönen, Juhani:

The Curriculum of the New Four Years Long Class Teacher Training Program in General Features (unpublished)

Kauppinen, Sirppa:

Teacher Education in Finland. Teachers of School Subjects in Grades 7 - 12 (unpublished)

Koskenniemi, Matti:

Teacher Training Reform in Finland and Research into the Instructional Process In van Herreweghe, M.-L. (Ed.) 1979. Current Problems in Educational Science. Rijksuniversiteit Gent, World Association for Educational Research. Pp. 25 - 40, and Comments to the Distributed Paper (unpublished)

Perlberg, Arye & al.:

Towards New Teacher Education Models. British Journal of Teacher Education, October 1979, Vol. 5, No. 3, Pp. 263 - 281.

Zarzycki, Edmund:

Zur praktischen Ausbildung der Lehrer in Poland (unveröffentlicht)

Appendix II

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